SHOOTING:

ITS

APPLIANCES; PRACTICE;

AND

PURPOSE.

LONDON:
GILBERT AND RIVINGTON, LIMITED,
ST. JOHN'S SQUARE.

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BY

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AUTHOR OF "SCOTTISH FIELD SPORTS," ETC., ETC.

First, I'll instruct thee in the rudiments,
And then thou wilt be perfecter than I.
CHRISTOPHER MARLOWE.

As Sir Humphrey Davy and I shot partridges together in the morning, I perceived that a man might pursue philosophy without abandoning field sports. SIR RODERICK I. MURCHISON.

SECOND EDITION, REVISED AND ENLARGED.

London:

SAMPSON LOW, MARSTON, SEARLE, & RIVINGTON,

CROWN BUILDINGS, 188, FLEET STREET.

1881.

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former precedent. This arises partly from a new mode of treating the barrels, incompatible with muzzle-loading, and which, while most injudicious attempts have been recently made to strain it unduly, is on his principle sound and durable. During these recent rapid changes the author has felt himself constrained, however flattering have been the many urgent calls upon him not to let his pen lie idle, to await another definite stage in the onward march before sending forth a new volume, and this he now does, as written up to the very last step, he may say, before going to press.

To those who look for a descriptive catalogue of guns, or of the several parts of a gun from a mechanical point of view, this book is not suited. Its aims and purpose are of a much higher order. It is essentially and emphatically a sportsman's book, written by a sportsman for sportsmen. That he is also a gunsmith merely gives him greater combination. Naturally an ardent lover of the trigger, his profession caused him to study every branch of shooting as closely as if it were an exact science. He endeavours to convey to his readers not dry formulæ or receipts as it were, but such information, through the medium of print, as age and experience convey to youth familiarly in the affairs of common life.

> Believe me, sir, the knowledge thou dost seek
> Is slowly gain'd; yet no one may possess
> What others cannot gather—step by step—
> As straw by straw our gleaners make up sheaves.
>
> *Old Play.*

All experience in matters connected with practical gunnery is very slowly acquired, and no one without such actual experience would readily believe in the difficulties to be almost daily overcome so as to excel in this art. This arises from the utter absence of absolute rules which might guide to the desired end. Abstract gunnery is little more than scientific verbiage; following results, not producing them.

In the remarks upon "grouse disease" the author makes no pretension to define what the malady is. That is a question for the pathologist, not for the sportsman. Death may be caused by parasites, by inflammation of the liver, or by other forms of disease. He solely concerns himself with the state of matters which brings about conditions in which alone disease occurs. The direct cause of disease and death may be a mystery, but the history of the epizootic attacks be none. The two have been muddled up so as quite to mystify the matter; hence so great diversity of opinion.

The third and concluding part of the volume departs entirely from the common topics of books of this kind. The only difficulty was to condense the matter therein. Hence if any reader think the argument is incomplete, he may rest assured that it is far from being exhausted.

INTRODUCTION.

MAN is by nature less endowed with the means of attack and defence in proportion to his requirements than any other animal. His wants are numerous; his natural means of supplying them are of the most inferior order. He has neither the teeth of the lion, the claws of the tiger, nor the exquisitely deceptive powers of the fox, to beguile, strike down, or rend his prey. His skin is soft and smooth, and demands, save in the torrid zone, artificial covering. If he seek this in the warmly-furred coats of other animals, he has not the speed to overtake them in flight, nor the strength to seize and master them if overtaken. Nearly every want must be supplied by artificial means. These means his reason supplies. His powers of observation in early ages taught him the elasticity of wood; hence sprung his bow. Simultaneously, if not indeed previously, he had observed that a long-armed man could throw stones farthest, and he artificially prolonged this length by the sling. Step by step he improved the art of throwing projectiles, in war or in the chase, finally calling in chemistry to his aid, and by the use of gunpowder obtaining an elasticity excelling that of all former instruments.

Slowly, extending over centuries of years, man has improved upon the mode of using this great agent, gunpowder. The principle has remained the same, confinement and ignition in a closed space, the breech of the gun. But, in the mode of loading, of ignition when loaded, in the material and dimensions of the fire-arms, in the endless little niceties which go to make up the science of gunnery (even yet far from being defined), there has been expended an amount of ingenuity and labour positively beyond all comparison with the simple *primâ-facie* appearance of a rifle, fowling-piece, or cannon. To touch lightly on the more recent advancement in construction, to convey in a popular manner the accumulated knowledge of a lifetime, and some reasons why a modern gun should or should not shoot well, is my purpose in the following pages in the first place. In the second, I will endeavour to teach something of the art of shooting—its Practice; and in the third place, I will endeavour to expound, so far as space may permit, the Purpose of shooting:—What men shoot for as a sport. I am induced to write this last by recent utilitarian attacks upon the morality of field sports, in which the assailants have rashly assumed that their arguments are unanswerable, simply because sportsmen have rarely troubled themselves to reply, and when at all, only in short and fugitive writings, more impassioned, perhaps, but certainly less logical than those of their practised adversaries. I hope to write less as a defender than an assailant, or at least to show that field sports require no apologists. At no period in history has so great attention been paid to, or advancement made in, the

art of gunnery, in all its branches, as during the last twenty-five years. Beginning with the startling announcement that a Lieutenant Minié, of the French army, had invented a new form of rifle bullet, of formerly unheard-of capabilities, the movement has gone on with increasing rather than diminishing speed, and it is not too much to say that, how in warfare to throw projectiles still farther and farther on the one hand, and how to build ships and fortifications able to sustain the shock of these projectiles on the other, lie two of the greatest and most interesting problems of the present time. In this movement sporting fire-arms have naturally been made to bear a part, and it is difficult to say whether they have preceded or followed the sweeping alterations that have been made in the construction of military weapons. Sportsmen certainly adopted breech-loaders before these came into general use in warfare, but this may apply more to adoption than to actual invention. Governments, like all other large bodies, are slow to move, while sportsmen act individually, and with greater alacrity. Very probably, however, the rapid adoption of the breech-loader in field-sports had some influence on its being introduced into warfare, which is affected in a very high degree thereby, the change being all on the side of civilization and progress, the breech-loader being pre-eminently the weapon of the soldier of intellect and education. This great revolution in fire-arms has been accompanied by so much general investigation into their mechanical parts that I shall, in the following treatise, say comparatively little thereon, but devote much of the space usually taken up by a descrip-

tion of the gun and its parts, to the conveyance of general. and I hope useful, information on the art of shooting, and on those contingents and accessories which bear usefully on the subject.

From the earliest ages, then, man has sought after and used engines by which objects could be struck at a distance from the projector. Stones and javelins, most primitive of weapons, were thrown from the hand—the muscles of the arm being the propulsive agent. The boomerang of the Australian savage is a remarkable advance upon this, being shaped so that the action of the air causes it to alter its line of flight, and even to return to near the thrower. This fact proves that there may be some hope of a bullet, fired from a smooth bore, being so formed as to rotate by the pressure of the air during its flight, although it must be granted that the cases are widely different. The sling, increasing the power of the muscles of the arm, was probably the first extrinsic appliance, followed by the long bow and arrow, and these again by the more complicated cross-bows, catapults, and other engines of war and the chase. Lately the elastic power of caoutchouc has been applied to the throwing of harpoons, it is said with some success. I can personally vouch for the aggregate power of the elastic cords, which are separately extended with ease and simultaneously let go, their united force upon the harpoon being very great. In all these cases elasticity, or conversely contractility, are the prime agents, and the efficacy of firearms depends upon the same principles. The contractile powers of the human muscles are only elasticity in another

form, and the elasticity of the gases produced by the combustion of gunpowder is only an increase of that of the atmosphere. The nearest approach to fire-arms for practical purposes is the blow-pipe of the South American Indians, who send a small poisoned dart with effect through a tube, by the action of the lungs. The schoolboys in Germany, using a wooden tube some six feet in length, acquire great dexterity in this practice. Fifty or sixty years ago the author's father had in his employment several journeymen gunmakers who could hit a small mark with a clay ball, blown through a common gun-barrel, at a distance of more than twenty yards. So dexterous were they that they could stick these balls upon the hats of persons walking along the opposite pavement of the Trongate of Glasgow, a wide street; feats certainly not to be admired for their prudence, however much for their cleverness. The almost total disuse of other weapons than fire-arms has led us to forget the power of those agents. Hollow walking-sticks are now made, through which are blown darts with such force as to easily perforate a silver florin at a distance of several yards. In all such blow-pipes the breath is the elastic agent, and steam itself, which indefinitely increases the working powers of mankind, is only an extension of this agency, and has been frequently proposed as a substitute for gunpowder. When at college, the author formed one of a small party who carried the art of slinging to a height surprising to themselves. The Scriptures and ancient history testify to the remarkable dexterity of the slingers who formed so important an element of large armies.

There is ample proof that leaden projectiles, as near as possible alike in shape to the conical rifle bullets of the present day, were used by the slingers of ancient times, notably, if I recollect aright, at the battle of Marathon! Thus we may see how true it is that there is nothing new under the sun. We have the authority of Sir Archibald Alison ("History of Europe," vol. ix. p. 181) that the Patagonians, "mounted on their small but hardy horses, discharge their slings, loaded with stones, with such address as to hit any animal at the distance of four hundred yards." That extraordinary Bengal hill tribe the Juangs, ethnologically the rudest in, or as they have been termed "at the very bottom of" all humanity, the "representatives of the Stone Age *in situ*," have for their national weapon the sling made of cord, and use stones as they find them. A peaceful race, calling themselves the direct descendants of the first human beings, but not by any means the fathers of all mankind (a suggestive fact in these days when so many express their belief in diversity of races), it is only when roused by their neighbours that they use the bow and arrow. We may fairly draw from this that the sling preceded the bow, at least if we accept the Juangs as the type of man in his purely original state, which, with their coverings of leaves and other primitive habits, we may fairly do on the soundest principles.

Gunpowder itself may probably yield in time to some superior projecting agent. In 1857 I predicted an early change in the ingredients of gunpowder as being exceedingly probable. Since then my vaticinations have

been verified, and I could hardly expect credence were I to tell the number of patents which have been taken out since then for new explosives. In point of fact, like gunnery, these form one of the great topics of the time. As there is nothing like competition to give a stimulus to improvement, to meet the rivalry of these new agents, one of the firms manufacturing the old powder have honourably distinguished themselves in adapting that substance to the requirements of breech-loaders. I refer to the old established and eminent firm of Messrs. Curtis's and Harvey. With powder manufactured by them I have, in my own case, made all the endless experiments required in bringing out improvement in fire-arms and projectiles. Farther on the reader will find more information on explosives in general.

The art of shooting flying and running game is now so common, and the manufacture of fowling-pieces brought to such perfection, that many readers may be surprised to learn that their use, in field sports, is of comparatively recent date. Fielding, a correct delineator of the manners of his times, writing about the year 1748, speaks of shooting a crow flying as a feat of expertness likely to be considered as "incredible." At a still earlier period shooting formed so small a part of field sports, that the use of a fowling-piece is only incidentally mentioned in "The Gentleman's Recreation" (Third Edition, 1686), In that celebrated work the method of taking all kinds of birds, from the pheasant to the wren, is laid down as "by nets and bird-lime;" and even the use of a setting dog was only employed in netting, not in shooting, partridges.

In the pursuit of water-fowl, for sport, nets were used instead of the gun; and the dogs were trained to drive the birds from their coverts into the nets, which sport was practised "in moulting time, when the wild fowl cast their feathers, and are unable to fly, which is between summer and autumn."

At that period gun-barrels were made of an inordinate length, which completely prevented the rapid aim necessary in shooting flying; while the action of the lock was too slow to render the aim and ignition of the powder simultaneous. In the work above quoted, we read:—"That is ever esteemed the best fowling-piece which hath the longest barrel—being five foot and a half, or six foot long, with an indifferent bore, under harquebuss." This was curiously illustrated in the great Tichborne trial. One of the articles referred to in evidence being a gun which had been found a long time ago at the bottom of a pond, and Lord Chief Justice Cockburn put this question to a witness, its owner: "It is one of the old sort, I suppose?" Answer, "Yes, my lord, the barrel is six feet long" (laughter). *Daily Press*, *5th September*, 1873. The people in court laughed at the apparently absurd length, just as they would have laughed 200 years ago at that of twenty-eight or thirty inches. Thus things change with time, and yet may be all along correct, for in all probability the gunpowder of 200 years ago would have been quite ineffective in short modern barrels. The barrels made in Spain, at one time so celebrated, were also of extreme length. Spanish barrels were certainly for a long time the best in Europe, although now far surpassed by those made in England.

Those who are curious in such matters, consider the barrels forged by Nicholas Biz—who lived at Madrid, and died in 1724—to possess a superior excellence; and also those of his contemporaries, Juan Belez and Juan Fernandez. The barrels made by these makers sold at 44*l.* sterling for a single barrel, equal at least to 80*l.* at the present value of money. They were composed of horse-shoe iron, not twisted, but welded longitudinally; and so great was the care in manufacture, and attention to the purity of the metal, that from forty to forty-five pounds of iron were consumed in the forging of one barrel, weighing less than seven pounds when finished.[1]

In like manner, the improvements upon other parts of the gun have tended to render its use more effective in field sports. The invention of twisted barrels, giving great strength with little proportionable weight—of the patent breech—and, above all, of the ignition of the powder by means of the percussion cap, leading up to the perfecting of the breech-loading system, which is incompatible with the flint and steel—have all been conducive to that effect, and rendered the old-fashioned weight and length of barrel superfluous. As now made, the modern fowling-piece is an almost perfect piece of mechanism; but its apparent simplicity is the result of a

[1] As some readers may possess old Spanish barrels and desire to know if their makers were famous, I subjoin a list of names of high repute:—Diego Esquibel, Alonzo Martinez, Agostin Ortiz, Mathias Vaëra, Luis and Juan Santos, Francisco Garcia, Francisco Targarone, Joseph Cano, N. Zelaya, Francisco Lopes, Salvador Cenarro, Miguel Zegarra.

series of small inventions and improvements, which, in the aggregate, have cost an incalculable amount of time and money. Even yet the inventive faculty is racked for new modes of loading, ignition, and obtaining strength in shooting.

In the year 1856 was introduced from the Continent that most daring alteration—the sporting breech-loader—which has carried the day against its old competitor, in so far as sportsmen in this country are concerned, although for rough, outlying, or foreign work, the muzzle-loader may, for a time, hold its own. That the breech-loaders, as originally introduced, were defective, and open to many objections, cannot be gainsaid; and although, on their construction, it was plain that they might be equal to the requirements of the weak gunpowder and light charging of the Continent, still they were not equal to our strong powder and severe work. This proved itself by their rapid deterioration at the jointing, and it soon became clear that that jointing was insufficient. As is not uncommon, the ingenuity of the foreign inventor has been improved upon in this country. Our mechanists, while less inventive, surpass those of the Continent in carrying out new modes of construction—in all branches of manufacture—to a satisfactory end. To explain, not the mere mechanical details, but the *rationale* of the breech-loader, will be one of my greatest aims.

Should I succeed in making myself understood in teaching the young sportsman the theory of how and why a gun is good, or otherwise, and the proper modes of loading, taking aim, and such simple matters, my end

will be served; as no written instructions, however elaborate, can stand in the place of that practice in the field which alone can give experience to the hand and eye. Still, it appears to me that much useful written instruction may be given, with which practical skill may be sooner attained; and that the young sportsman will not be the less certain of his aim, on the mountain or in the covert, because he knows something of the tools with which he works.

I have one great general difficulty to encounter, in the fact, that there is no absolute rule defining what a perfect gun should be. A chronometer, for instance, is made to measure time. If it do this, we ask no more. But a gun has to perform undefined work, and perhaps there never yet was one, however good, but its owner wished to get still a little more out of it. There is also a continuous tendency to the adoption of specialities in fire-arms—of no prime importance—frequently hurtful—the really good weapon being that which possesses the greatest general capability. Such a gun is the product of the soundest judgment and highest mechanical skill, and is the one to fill the bag. There is another difficulty, viz., in the apparent contradictions. Space would fail me to clear up these, if indeed this ever could be done thoroughly. There must be therefore a general compromise in reasoning—similar to what must be in weight, calibre, and length of guns themselves—which may erroneously lead readers to think that the author has not fully mastered his subject. I think this explanation is fairly due to myself.

THE ART OF SHOOTING.

Part I. Its Appliances.

OF THE BARREL.

THE barrel of a gun is its essential part. Other parts of the work may be clumsy and deficient—the lock may grate fearfully in its action, nay, may be wanting altogether [many a good Scottish hart has been knocked over by "Donald," with his "lang Queen Anne," from behind a dyke, an attendant kilted sprite blowing a red peat at the touch-hole]; the stock may possess neither internal toughness or external beauty—but without a good barrel all excellence and virtue are absent. The requisites in a barrel are—strength, lightness, elasticity, balance, and force of shooting. To gain these requisites, it is necessary that the metal used be of superior quality, and be in itself tough, and yet elastic, and also that it be wrought so as to give the grain of the iron the greatest resisting power to the expansive force of the gunpowder. While barrels were welded longitudinally—that is, with the grain of the iron and the closure of the welding running parallel with the bore—much weight was necessary to retain sufficient strength; but the invention of the spiral twist has enabled the makers to turn out barrels, perfect in

strength, of very much reduced weight. On no part of the art of gun-making has more ingenuity been exercised than on barrels. They have been forged of every possible variety of iron and steel—from old scythes, from needles, from wire, from horse-nails, and many other articles. They have even been made, as whim suggested, with a lining of steel, and with a double spiral of iron and steel alternately, and of other intricate combinations. All these experiments have proved that barrels of horse-nails, commonly called "stub" (but now obsolete), were, for the heavier class of guns, unsurpassed; and that, for light barrels, a variety of iron termed "Damascus," a mixture of iron and steel in equal or nearly equal parts (but which, in its finished state, really contains no steel, it being decarbonized in the forging), is preferable to all others. In no variety of iron is the percentage of barrels burst at proof so small as in this. The material is old horse-nails and coach-springs combined, the metal being repeatedly cleaned, by various processes, from all extraneous matter, carefully mixed, and wrought into barrels on the Damascus principle, which is neither more nor less than a series of involutions of the metal, so that its fibre and consequent resistive powers extend in all directions. There has been a well-sustained but ineffective attempt in one or two quarters to claim superiority for a variety of metal under the name of "silver-steel," as if it were distinct from all others. At first the term, if used as a distinction only, was honest enough, and I have myself so used it, meaning thereby to distinguish the compound iron and steel from simple iron only wrought into the

Damascene pattern. But the title "silver-steel" has been strained into an affected conveyance of superior and more expensive quality, the utter groundlessness of which will be at once plain to the reader when he is informed that all the difference between it and "Damascus" lies in the latter having 50 per cent. each of iron and steel, and the former a slight excess of steel, certainly not more than 2 per cent., in its composition. Thus, the money value and general treatment of the metal in all kinds are the same. With the free choice of either before them, 999 gunmakers out of the 1000 prefer Damascus, and indeed the question is not worthy discussion, were it not to deprecate claims for a pretended higher value by the use of mere catchwords. Any merit possessed by the so-called "silver-steel" rests, not on its material, but on that being woven into the Damascene pattern. Sometimes the metals are combined in several plates, and the barrels are then termed "laminated steel." This variety was at one time considerably used, but has been discarded as a general rule through it frequently containing flaws, and especially foreign matter, such as sand, between the laminæ, where they lurk unsuspectedly for a time. The general term "steel" is improper in all these varieties. The repeated white-heats to which it is brought should remove all carbonization from the metal, and leave behind a fine mellow, elastic iron. No barrel of steel, pure and simple, thin enough for a fowling-piece, could be made, unless at such expense as would be absurd, and then would be unsafe. When the term "steel," then, in any of its forms, is applied to fowling-piece barrels as in regular

use, it is a misnomer, and 52 per cent. steel to 48 of iron is the highest proportion, the whole being converted to iron in the working. It is right to state that various new, modified forms of steel, so called, are being used for fowling-pieces. They are so exceptional, however, as hardly to call for comment. The great fact should not be forgotten, that while regular gun-barrels, Damascus and others, will bear a strain exceeding their resistive powers against distension, expand a little, therefore, and yet remain safe, steel barrels, being crystalline, once strained, lose all their safety at that part. Their molecular structure has become quite changed, and been irreparably injured, so that final bursting is only a question of time. Notwithstanding all this, there is an air of superiority in the term "steel," or "laminated steel," over "iron," which is very misleading. Fine phrases are always seductive. "It is common with men," says Lord Bacon, "that if they have got a pretty expression by a word of art, that expression goeth current; though it be empty of matter." All steel barrels are especially apt to fly to pieces during severe frost and therefore are not adapted to use in cold climates. Thick rifle and pistol barrels are comparatively safe. Damascene, then, originally half iron and half steel, are certainly the safest of all barrels. They combine the softness once so much desired in flint guns, with a hard, cold-hammered surface outside and inside, and besides possess an elasticity beyond all other barrels whatever. For light guns they are, consequently, incomparably the best. It is a somewhat curious and unsatisfactory truth, however, that

there frequently occurs a run of bad metal in one or other of the many varieties of barrels. This is unpleasant to all concerned; to the sportsman, who, desirous of having a new gun with the barrels made of his favourite iron, is told that that iron is not good at present; and to the gunsmith, who is under the necessity of telling him so at the risk of having his motives and veracity brought into doubt. Considering the high prices paid by sportsmen for the finished work, and by gunsmiths for the raw material, it might surely be worthy the attention of iron-makers to strain every effort to maintain the quality of each variety of iron in its entirety. The difficulty is, that in this case, as in others of the same kind, the commercial element rules; while the gunsmith, on the other hand, has much of the artist's feeling in his work, is brought into personal contact with his patrons, is anxious to adopt their suggestions, and does not view the matter from a commercial point only. A good gunsmith not only takes an interest in the future history of every gun he makes, but has a high professional reputation to maintain. Every gun he turns out is carefully numbered, named, measured, weighed, and registered to prevent piracy, and the mere fact of this piracy unceasingly existing is the best proof that his claims for superior workmanship are well founded. The efforts of the Continental iron-makers have of late been most praiseworthy, and the English have been necessitated to strain every nerve to prevent their being eclipsed. The result, as usual with competition, has been generally beneficial. I have recently discovered, in a quite unex-

pected quarter, a small manufactory of the most exquisite "tubes" I have ever seen. The metal in these is beyond all praise. Yet close scrutiny is always required, as, to use commercial phrascology, there is too frequently, as in more things than gun-barrels, a wide difference between the quality of sample and stock.

In addition to the above kinds of iron, the English iron-masters have devoted great attention to the manufacture of new iron, suitable for gun-barrels; and, by a proper adaptation of the fuel and methods of working the iron, have succeeded in producing metal suitable for general purposes, and of which, in fact, almost all the more common barrels now produced are composed. The range in value of even this plainer metal is very great, not less than 400 per cent., making a vast difference in the price of the raw material, if we consider the great loss in forging. The author has had barrels forged of iron made in the neighbourhood of Glasgow; and although exceedingly tough, not one having given way in the proof-house, still it was unsuited for the purpose, being full of specks, technically called "grays." This shows how carefully the iron must be prepared in the first instance, as no amount of toughness and elasticity will compensate for the absence of a sound, unbroken surface, when finished; and great art and experience are required in the preparation of iron which will be free from these specks, which are the annoyance of the trade. Common barrels are little in use; they are forged of iron lapped longitudinally round a mandril, the edges being welded together; as the grain of the iron runs along the barrel,

they consequently do not possess the elastic strength of twisted barrels. It is just as if a wine cask were made without hoops, the strength depending on the firm adhesion of the staves at the edges.

Twisted barrels are of two kinds: the one being of simple iron, twisted while cold round a mandril, so as to assume the exact appearance of a spiral spring; and the other of iron which is first twisted on itself like a rope, then rolled out again into a bar, and last of all twisted cold, like the former, into a spiral, before being welded into the barrel. The latter (as well as the genuine "Damascus" before mentioned) is termed "Damascus," or "stub Damascus," according to the figure into which it is wrought, and quality of the metal. The repeated twistings are intended to throw out any hard, gritty particles of iron, and, by increasing the fibre, give the barrel greater strength; and certainly when properly executed, and the metal not too much strained, they must give greater strength and elasticity. After the iron (of whichever variety it be) is twisted into the spiral shape, in pieces of several inches in length, the process of forging and joining the whole is carried on with wonderful rapidity. Three hammers play on the heated part so quickly and exactly as to produce complete adhesion and solidity; and of course on this part of the process depends the freedom of the finished barrel from all flaws caused by imperfect welding. Much depends upon the proper state of the fire, and other accessories, and this is the reason why high-class gun-makers do not forge their own tubes. It is an understood fact that the best barrels can only be

produced during a few hours in the middle of the day, when the whole forge has been brought into due trim, the early and later hours being devoted to inferior barrels, for which the high-class gun-maker has no requirement. The nearer the barrel can be brought to the intended weight by the hammer the better, because the repeated strokes harden and produce a sort of skin upon the iron, both outside and inside. It is also of the greatest consequence that the process be not hurried through with little hammering at each successive heat. The longer the hammers are kept in play on the metal after each heat, the better are the barrels, and the stronger they will shoot. This care in forging is called "cold-hammering," which toughens and puts a skin on the iron, closes the pores, renders the barrel less liable to corrosion, and more capable of taking a high polish. It will at once be seen that the necessary time taken by three workmen in this cold-hammering process very much enhances the value of fine barrels. It is in this part of the process that the Continental workmen are deficient, but are threatening to rival the English. We have great faith, however, in English pluck and muscle. No foreigner strikes a blow upon the anvil like your English workman, and it will be our own fault indeed, if we do not maintain our superiority against all the world. It is also proper that the barrel be of equal thickness on each side, so that the bore be exactly in the centre, which preserves the strength and elasticity. After being forged, the barrels are ground outside, then bored inside, and subjected to the proof. The proof consists, taking No. "12" gauge as an average calibre, of above

four usual charges of powder for the first, and of three charges for the second proof, over which are tightly rammed, with a brass rod, a roll of strong brown paper, then a bullet, and over all another roll of stiff paper. The whole system appears perfect, and is conducted with care, and by men of the greatest caution and experience. The number of good guns bursting in use is consequently exceedingly small, and even then seldom, if ever, from intrinsic defects.

In former times barrels were brought to an exact round externally, by the painstaking process of first filing the metal into a square, then into eight and sixteen sides! The exterior form was finally either filed round, or left with the sixteen sides, these being almost always left on towards the breech, this latter form coming down to our own day, as many old sportsmen may recollect.

There is a common belief, often leading to the sharp depreciative question, "Are not all gun-barrels made in Birmingham or elsewhere out of London?" Certainly not. Only the rough tubes are forged out of London, where the higher branches, the proving, putting together, ribbing, and finish, are completed. It is in these that the great skill of the high-class London artisan is brought into play. Every manufacturer, be his speciality what it may, knows that there is an undefinable, and almost unaccountable, dexterity possessed by highly-trained workmen. No scientific means have been found to equal the palm of the female hand, dexterously applied, in polishing *papier-mâché* and similar articles. In like manner no ingenuity in turning lathes or other apparatus can rival the touch

of a London barrel-filer. He only uses the lathe to mark upon the barrels several guiding rings at certain distances, and then works entirely by hand, making longitudinal strokes with a brick-shaped (parallelo-piped) file, held in the hollow of his hand. He seems to know the thickness or thinness of each part by merely looking at it. He files the barrel so that it is equally strong all round, and dexterously hollows out the metal all along, so that it will be found, exteriorly, in fowling-pieces, to form a segment of a large circle! On this depend lightness and balance, combined with hard-shooting. Of course, all this could be done equally well out of London, but it is not; from this reason, that the wages paid elsewhere would not compensate for the time and skill bestowed upon the work. The best workmen are found in London because they flock to and are more highly paid there, and it is not probable that this position will be altered in our day.

Great resistance to the force of the powder is necessary in the lower part of the barrel; and consequently the thickness of the metal should increase rapidly in the last ten inches towards the breech. This rapid swell also reduces the amount of recoil, and makes the gun shoot stronger. Towards the muzzle, a good barrel cannot be too thin; if at all sufficiently thick to prevent injury from coming in contact with external objects, it is enough. No fears of bursting at that part, from undue thinness, need be entertained; and the gun will be found to shoot much harder from the expansion of the metal, than when the barrels are thick towards the muzzle. No barrel, save by some extraordinary chance, shoots well as it

leaves the hands of the workman in the first instance. After the gun has been built, and then only, it is prepared for shooting. No precise mode of producing good shooting—applicable to all barrels—has ever been discovered, and the final results, when the shooting is what is technically called "passed," are gained solely by experiment, at great expense, especially with breech-loaders. There is a common belief among sportsmen, or rather, I should perhaps say, there was such a belief, that gun-makers first test the shooting powers of barrels, using the good for high-priced, and the bad for low-priced guns. This is an utter mistake. The system never was to my knowledge in use, and, indeed, is impracticable. The superior shooting of high-classed guns is gained by slow and careful treatment. A rude, irregular force is always present in the first instance, and the gunsmith's art, in which some men have, it is difficult to understand why, greatly surpassed others, is to control this force, and give regularity and closeness of "pattern" upon the target without diminution of velocity. As the process is entirely tentative, he stops the moment he has gained his desired end. Hence there is no rule for the thickness of the metal at the muzzle, and the sportsman may safely rely, in a good gun, in this instance, at least, on the theory of Liebnitz, that whatever is, is right. Of course, barrels of good quality are here meant; and, in fact, when describing those minutiæ which make a really perfect gun, the best quality of material and workmanship is to be understood. For instance, a pair of Damascus barrels might be safely made of half the thickness of those made of the

"penny three-farthing skelp iron," more especially towards the muzzle; and this is one reason why a good gun, with well-forged and well-proportioned barrels, possesses so fine a balance. The weight towards the muzzle is reduced to the smallest possible amount; and the gun comes up to the eye freely and lightly.

There are various kinds of flaws in barrels, such as "cracks," "sand-holes," and what are technically termed "grays." The first two are comparatively rare, but the last is the great annoyance of the barrel-forger and gun-maker; and, in fact, may be said to exist more or less in all barrels. They are those little specks in the iron which may be seen more readily after a gun has been used, from the rust showing more upon them than upon the smoother surface. In themselves, unless very numerous, "grays" lead to no insecurity in the barrels, and are not real flaws; but the freer barrels can be made from them the better, as, unless when kept clean and well-oiled, they may in course of a long time deteriorate the barrel. As a rule they cannot be detected while the work is in progress, and only make their appearance on the barrels being browned. Conversely, strange as it may appear, most frequently they become less apparent in course of time, and on the barrels requiring to be browned a second time, disappear altogether. The reason why the first browning causes them to appear is that the infinitesimal quantity of oil they contain neutralizes the chemicals, and the mark is then for the first time made visible. The reason why they eventually disappear is their extreme shallowness. The very finest of barrels may therefore, and often have

been, rashly condemned by sportsmen for harmless spots which no foresight could prevent. Were they actual flaws, they would appear during the process of filing.

The "sand-hole" is a thorough flaw; and if the barrel stand the proof at all when it exists of any size, still it cannot be quite safe, as the hole will often run in a tortuous direction for a considerable length under the surface, being, as its name imports, full of fine sand, or probably of the powder used as a flux to promote complete adhesion in welding the barrel, which has adhered to the iron, and been closed upon in the act of forging. The Damascus barrels, in contradistinction to "laminated steel," I have always found in my experience the most free from "sand-holes." Indeed of late years I have not known an instance of this flaw, through using Damascus barrels in preference to all others. Many an annoying instance I had in the days when "laminated steel" was puffed up, and when, after a gun was nearly finished, a "sand-hole" would be discovered, into which I could insert a piece of fine flattened wire and pass it half-way round the barrel between the laminæ.

The "crack" is the worst of all flaws. This is a separation of the fibres of the iron from overstraining of the twist; and consequently every discharge of the gun must, by the expansion of the metal, more or less widen the crack, until it run right round the barrel. The same "solution of continuity" may also exist from imperfect forging, and the same result takes place. The author has repeatedly taken old double barrels asunder, with a crack in one of them so lengthened through time that the barrel

was nearly separated into two parts. When this crack runs round the barrel the danger of bursting is exceedingly remote; but should it have a longitudinal direction, or if there be two near to each other, the danger is much increased, and, sooner or later, the barrel will give way. The longitudinal crack almost never occurs; and all the varieties of Damascus barrels are the most free from this kind of flaw. A hole right through a barrel would be much more safe than any kind of crack; and, in point of fact, many barrels are safely used for years with a small hole right through them. A crack may at once be detected by suspending the barrels, and striking them with a piece of wood, when, if faulty, they will not emit the clear, ringing sound they otherwise do.

The outside of barrels should be well filed and polished. The smoother they are, they will remain the more free from rust, through the closing of the pores; and consequently they will last longer. The filing should also be regular, leaving no hollows, but retaining an equable strength, and allowing a regular expansion throughout the entire length when fired.

The inside should be as bright as a mirror, and free from flaws. Slight marks or rings, left by the boring bit, can hardly be avoided, and may be found in the best barrels; but there should be no hole likely to retain dirt or damp of any kind, which can corrode the iron.

Since the introduction of breech-loaders these slight marks form a frequent subject of remark. The tube, being open, is glanced through, and the presence of such a mark is detected, whereas with a muzzle-loader this might

never have occurred. Timid sportsmen fancy there is danger where none exists. In the first place, writing of course of these unavoidable marks only, no good gunsmith would permit any barrel with a real flaw to leave his hands. His final loss would be greater than his first. But besides that, in the tentative process of making a gun shoot well, he is bound by necessity to leave the barrel as it is the moment he has developed its shooting powers to a recognized standard. Hence he is debarred from polishing out any mark or discoloration for the mere sake of appearances. In breech-loaders the master-gunsmith enjoys the same opportunities to detect flaws as the sportsman, who may rest assured that the confidence put in the good faith and judgment of the former is not misplaced. The same minute marks existed in muzzle-loaders, and were known to do so by all gun-makers and by most experienced sportsmen, yet no one thought of challenging them; they were taken as a matter of course. The facility of looking through the barrels of breech-loaders has caused these utterly harmless marks of boring to be considered something new and improper. The spots are infinitesimal in size or depth, and are only visible through contrast with the bright polish of the general tube. The barrel never deteriorates with time through their presence.

Good barrels will often, when subjected to the same circumstances which would burst an inferior article, bulge, or swell out, like a glass tube heated at one part and blown into. When the bulge is not very large it may be partly hammered down, but no barrel so treated can be called truly safe, until subjected to a fresh "proof."

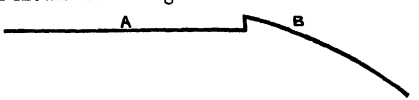
It may be said that when a barrel gets thus bulged, it need not be thrown aside immediately, as it may occur under circumstances which would lose much sport; but the earliest opportunity should be taken to have the damage repaired, if indeed that can be done.

Bulges are now much less frequent than when muzzle-loaders were in use, as they most frequently were caused by a wadding being not rammed home in the first instance or having started afterward. "Concentrators" (for causing guns to shoot more closely) have, however, been blamed for causing bulges in breech-loaders. This has often been alleged, but there seems to be no positive proof of the fact, although a London barrel-maker assures me that he has observed a great increase in the number of barrels so damaged coming in for repairs.

Barrels should be kept well browned. This is an artificial corrosion, produced by acids and other agents, carried on to a particular point, and then arrested. The result is the showing up of the figures in the twist of the metal (by many supposed to be painted, and again, in its turn, imitated in worthless guns by what may be termed painting), and the hardening, by carbonization, of the outer surface, and consequent preservation of the metal. A very few sportsmen prefer keeping the barrels clear and bright; but this is at the daily expense of so much metal, wearing out the barrels much sooner than would otherwise be the case. Experience has convinced me that guns, if fairly kept and not overworked, become seasoned as it were by time. The whole outer surface, not only of the wood but also of the iron, seems to harden and become

less amenable to injury. I have, since coming to this conclusion and recording it on a former occasion, seen a corroborative statement, to the effect that there is reason to believe that iron cannon undergo a similar hardening process, so that they become less liable to burst. Of course these remarks apply to the materials only, not to the fitting.

The form of the gun rib is immaterial; it is sufficient that it be smooth and regular, and above all, lie flat upon the barrels. An entirely different form of rib, however, should be made for the use of sportsmen who have had the misfortune to lose the sight of one eye. The higher the rib is towards the breech, the greater will be the point-blank range of the gun; but this forms an unwieldy gun, and should be avoided. The longer the barrel, the higher must the rib be at the breech to maintain the elevation. From the improved shape of barrels of late years—swelling rapidly towards the breech—elevation of the rib is not much required, the swell of the barrel in itself serving the purpose of elevation, and from this cause guns can be made much neater in appearance, and more handy than formerly. Where, through the sportsman having a tendency to fire under his birds, or other cause, unusual elevation is desired, this can be had without an ungainly high rib, by putting the extra-elevation on the false-breech, there being in this case a step down to the rib, as shown in this diagram.



A, rib; B, false-breech. Actual size of step.

The sight at the muzzle is a small ball of metal exactly in the middle of the rib. The slower a sportsman shoots, the larger he likes the sight; and with a proper style of shooting it is altogether superfluous. It should be noted, however, that for duck-shooting in the dusk, or for all kinds of shooting in jungle, where life and limb may be at stake, a good-sized sight, composed of silver or platinum, is to be recommended. I am, at the present time of writing, building a gun having an expensive diamond for its sight, for use in duck-shooting! A touch of phosphorus on the sight has been used in duck-shooting at "close of eve;" but it is very probable that no such factitious aid is required by sportsmen who keep both eyes well open, the gun mechanically following their gaze at the object to be fired at. It is worthy of note that the Chinese duck shooters shoot with the but-end of the gun resting on the hip. The eye therefore does not look along the barrel at all, and yet these men are said to almost never miss their aim!

LENGTH OF BARRELS.

THAT length of barrels which, in proportion to the width, would throw shot with the greatest force and regularity, when perfectly cylindrical, would be the best; but that length, with the exception of very narrow bores, would be too long for general use; and by proper boring, and having the metal in the barrels properly arranged as to

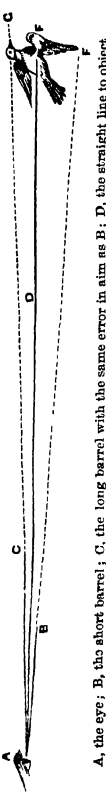
thickness, the same result can be obtained as from great length of barrel; and, in percussion barrels, as a rule, 30 inches have come to be generally adopted. I write of course of barrels of common calibre, say "12," "14," and "16." As we increase the width, to gain proportionate advantages we must increase the length. I also write of No. 6 shot, 270 or so to the ounce, the size invariably recognized in all comparative tests. That length is not founded, so far as the author is aware, upon any *a priori* principles, but from experience. When flint guns were in use, it was considered an axiom that barrels should be 49 times the length of the gauge; consequently, a 14-gauge gun being about 11-16th of an inch wide, 33 to 34 inches was a standard length (these dimensions are not mathematically exact); but, from the method of ignition by percussion allowing a much thicker barrel at the breech in muzzle-loaders, and in breech-loaders, not being affected by the comparative thickness of the barrel—that rule does not now hold so far as that it can produce the strongest and closest shooting barrel possible. So much is the method of boring altered, that length may now be said to be a matter more to be regarded in reference to the strength and style of shooting of the sportsman than to comparative power of shooting; consequently we find what are termed "covert guns" (which will be more completely described below), if well bored, shooting at least up to moderate ranges with a force and closeness which sadly damage all rate of length. Thirty inches seems, however, to have been adopted as the length combining the most advantages, and is a

good average. With a barrel much longer, should anything be gained in power, it is lost in unwieldiness, by which the game increases its distance before it can be covered; and with shorter barrels, unless very carefully bored, and the metal most correctly adjusted, the shot is too much scattered; and as few guns are turned out with proper care in boring, 30 inches, as above mentioned, has become the favourite length, and is likely to remain so.

The reader is requested to observe that in this, as in all gunnery, there is little question of absolute power as separated from a compromise between power in the abstract and mean capabilities in use. Rapidity in handling and facility of aim are elements of mean shooting capabilities as much as is absolute projectile force. Therefore it would be wrong to argue that the same amount of force can be developed with the larger sizes of small shot in a 26 as in a 33 inch "10" gauge gun. On one of the very few days on which my avocations have permitted me to shoot of late years, I killed a partridge flying singly (using No. 4 shot in a 10 × 33 Lockfast breechloader), at a distance of certainly considerably over 100 yards, the bird falling dead! Here there is evidence of maintained velocity which I cannot account for otherwise than by the comparatively prolonged operation of the gunpowder gases upon the shot in the 33-inch barrel. It is known that steam will develope velocity in a projectile in proportion to the duration of its action upon that projectile, and, although infinitely quicker, the action of gunpowder is likely to be the same in some degree. In this instance the bird was flying over a field at great

distance and elevation, and having had few shots afforded me for nearly an hour previously, and being also desirous of severely testing "Schultze" powder, I fired in a half-reckless "hit-or-miss" humour, and, to my surprise and that of my friends, down fell, with many an airy wheel from its great height, the unfortunate victim of experiment in projection. The reader may rest assured that there is no exaggeration of distance. But on the very same day I missed, to my intense disgust, several shots which would have been certain, and even easy, with barrels of shorter length.

It is here to be particularly noted that, in addition to long barrels being more likely, in the first instance, to shoot closer than short ones, and therefore kill game at longer distances, this superiority in effective range has been exaggerated by another cause. Only the centre pellets of the discharged shot hit an object with the full force developed; and short barrels, though propelling the centre shot with the same velocity, are more apt to hit the game with the outside pellets. The reason is obvious on examination. The shorter the barrel, the greater the ratio of divergence. To illustrate this: draw a straight line of say 5 inches long, upon paper, then draw a second line, at a very acute angle with the first, of 1 inch in length, diverging 1-16th of an inch. Then, making a mark at the end of the first line—say, for illustration, a flying bird—and the small probability of hitting it will be seen. Now draw a line $1\frac{1}{2}$ inches in length, but diverging also 1-16th from the first in that length; it will be found that although, in this longer line the error



A, the eye; B, the short barrel; C, the long barrel with the same error in aim as B; D, the straight line to object of aim E; F, Divergence from short barrel; G, divergence from long barrel.

in aim is exactly the same as in that of 1 inch, the probability of hitting the bird is greatly increased. The illustration will be much more evident if drawn upon a larger scale. To apply this: the first line is the proper line of aim; the mark at 5 inches is the object fired at; the second line is the short barrel, held a little off the proper aim in firing, and showing small chance of hitting; the third line is the long barrel, also held a little away, but at exactly the same degree of error as the other. The result of applying the rule will show how very small a chance there is of hitting with the former at all; and yet both guns are fired alike—not, of course, quite correctly, but the one as truly as the other. This may not quite apply to shooting with both eyes open. On this system the aim is taken instinctively, without any looking along the barrel; but in all other cases, where a deliberate aim is taken, the longer the barrel, consistently with ease in handling, the truer must be the aim. But it is this latter style of shooting that the young sportsman is recommended to avoid; and if it be not considered too pre-

sumptuous to introduce my own personal experience and skill in shooting, I should decidedly advocate the use of barrels—the calibre not being greater than 12—of 26 to 28 inches in preference to all others, as having enabled me to do all that can be done in the field, in fair average shooting at general game, with guns of any length whatever. But there must be no shutting of one eye, and puzzling the other with looking for and following the game, and keeping the gun all in a nice, correct line at the same time. Both eyes are quite needed, and sometimes even something more would not at all be unnecessary.

There is not a more frequent question put by sportsmen than that of asking the propriety of cutting barrels to a shorter length. A gentleman finds he has a 32-inch gun, shooting well, properly adapted to his shoulder, but above his strength, or badly balanced. Gun-makers, until very recently, advocated barrels exceeding 30 inches. Long barrels, throwing entirely aside more important considerations, certainly excel in shooting, when little or no trouble is taken in boring, and cost no more than the shorter ones. The gunsmith may very naturally, therefore, recommend 32 inches as the best and surest length, and this honestly enough. The gun is examined before delivery, and found not ill-balanced. But, after fatigue, the case is altered, and the wrists are worn out. Again, it not improbably occurs—writing from experience of guns submitted to the author—that, to counterbalance the extra weight and length of barrels, the stock is loaded behind with lead. Here is a double evil, and no possible gain.

Unwilling to spoil a good gun, the owner prefers—unless his purse be a long one, so that the price is of no moment—to go on in a half-satisfied sort of grumbling manner with his 32 inches, and finds such a remarkable diversity of opinion when he does seek for information, that he gives up sufficient inquiry in disgust. The fact is that the barrels can be cut with safety, if the boring be altered to suit the reduced length, and in this boring or not boring after cutting lies the whole mystery. But it follows as certainly as night does day that, to cut a well-bored gun, and not alter the boring after cutting, is to spoil the shooting. On the other hand, it may happen that, from causes too technical to go fully into, the shooting will be improved by cutting the barrels, this shortening increasing the velocity of the shot, which had formerly been retarded by undue condensation of the air in front of it. As it is in accordance with human nature to publish success and conceal defeat, so we often read of improvement by cutting barrels in letters addressed to the editors of sporting newspapers, and the general reader is too apt to believe that this improvement always follows as a matter of course. If a gun before the cutting was of the exactly proper bend it is essential that, to keep it so, the stock be also judiciously more crooked, else the shot will now be thrown too high. If, on the other hand, the stock was formerly too crooked, that fault has now in all probability been remedied.

THE GAUGE

OF a barrel is of importance, as the rule of weight at a given length, and for the particular kind of shooting. The gauge is the number of balls the barrel carries to the pound weight, thus—a 14-gauge gun throws a ball of 14 to the pound; a 12-gauge, of 12 to the pound, and so on; and as 30 inches has become the favourite length, so at that length, 12 has now become the favourite gauge, and is certainly an excellent one. At this gauge a good breech-loader of 30 inches may weigh only $6\frac{3}{4}$ to 7 lb., and that without recoiling, if the metal is properly arranged in the barrels. For light work $6\frac{1}{2}$ lb. may be risked. It is not a question of safety but only of recoil with adequate charges.

It is particularly to be noted, writing more especially of muzzle-loaders, that with average charges of gunpowder, narrow bores will throw small shot best, and the converse takes place with wide bores; and also that long barrels, say 12-gauge, 33 inches, charged with $3\frac{1}{2}$ drams powder, will throw small shot, say No. 7, charge one ounce, with very great force, and this length, as already observed, will also throw large game shot with great force and accuracy, but with a reduced charge of powder, as will be gone into farther on. I know of at least one sportsman who carries out this system even to shooting wild fowl with No. 8!

A writer on guns, desirous of conveying truth alone, is continually being met by paradoxes so remarkable that it requires great moral courage to record them, lest it

be thought he contradicts himself. Hence one of the reasons for the endless expenditure by governments on experimentation, pure science being hitherto of little use. I have said, for instance, that "narrow bores throw small shot best, &c." But I mean by "narrow," calibres of say 16 and 20. Let us go to say 36, and give 36 or 40 inches of length, and we can throw swan or goose shot with enormous velocity. I have made such guns for Dr. Rae, the Arctic explorer, to be presented to his Esquimaux guides, and he informed me that with arms of these dimensions he could bring down wild geese flying over head at great elevation, when no other gun could reach them. Another of these paradoxes will be found when I come to treat of proportionate charges of powder and shot. In testing the comparative shooting of barrels, No. 6 is the size always used, as being that in greatest use in the field.

Barrels of gauge 20 are sometimes used. This was one of Manton's favourite sizes; for No. 6 and 7 shot they are excellent when a very light gun, say under 6 lb., is desired. Properly bored, they need not shoot too closely; and for use in the early part of the season, in warm weather, they are certainly very light and handy. For winter shooting, when the gun is carried only during a few hours, the opposite extreme may be indulged in. Weight is then of less consequence, and 10-bores will bring down game at a great distance. Of course, from this reasoning, it is at once clear that when the sportsman uses only one gun (and the less he changes it the better), 12 must be an average size, combining many advantages.

It can be charged lightly early in the season, and will bear heavier loading when game get wild. In the days of muzzle-loaders 14-gauge was found to be more easily regulated for shooting than any other size.

For duck and geese double-barrelled breech-loading 8-bores, length 36 inches, weight 10 to 12 lb., are very effective. Beyond that calibre and weight I consider it quite unnecessary to go for guns to be fired from the shoulder.

Guns, after long use, frequently go off their shooting, and should be re-bored. There is nothing mysterious in the process; but it must be done with judgment and the most delicate accuracy, and with tools perfect in themselves. It is amusing to read advertisements pompously announcing boring barrels to shoot, by machinery. The machinery (?) in the first place is of the most meagre description, and, in the second, to really bore so would be to sacrifice all judgment and delicacy in the process. A competent person can at once tell, on inspection, whether or not barrels can be successfully cut or re-bored; and in the latter case money need not be thrown away in mere experiment without the fair probability of a favourable result. The same application of judgment and skill can improve barrels which shoot too widely or too closely, and, as mentioned above, good-shooting barrels should never be shortened without altering the whole internal proportions, it being a thousand to one that the alteration has changed their whole style, and caused them to shoot wildly.

One word in conclusion on barrels. Sportsmen are apt to

fancy that good shooting is mainly derived from weight. Weighing the barrels of their gun against those belonging to some friend, and finding them somewhat lighter than the others, although the guns, as a whole, weigh exactly the same, a suspicion is apt to arise that there must be something wrong with the lighter pair, or, at all events, that they will shoot inferiorly, or at least recoil. Neither of these faults necessarily follows, and taking for granted that the metal is properly proportioned throughout their length, the probability of superiority, in all regular game shooting, and with no departure from the average charges, rests with the lighter pair of barrels and the heavier stock. Of course this argument must not be carried too far, but, on the other hand, nothing is more certain than that unduly heavy barrels will shoot sluggishly. It has been frequently proposed to unite the double barrels at unequal elevations, so as to gain greater range by raising the muzzle of that which the sportsmen fires second, usually the left. All such complications, which look well enough in theory, seem to fall to the ground in practice, and this proposal is only another of the endless suggestions which are quite superfluous. The two-eye system of aiming quite disposes of this one in particular.

THE STOCK

SHOULD be exactly fitted to the shape of the shooter. With a stock of improper length or bend, certainty of

aim may be acquired by long use and practice; but still that readiness under all circumstances which accompanies the use of a properly-suiting gun can never be attained. On putting a gun to the shoulder there should be no straining of the neck to take an aim. When the eye is fixed upon a distant point, and the gun raised to the shoulder, the object aimed at, the sight at the muzzle, the centre of the breech, and the eye, should all be in a direct line, without further adjustment. To ascertain whether or not the shape of the stock is that best adapted for the shooter, he should, in this manner, frequently raise the gun to his shoulder, and take aim at a distant point with both eyes open; then, closing the left eye, he will perceive whether or not he has mechanically taken a correct aim. If, the left eye being now closed, and the gun held firmly in the same position, he do not see the object, the stock is too crooked; if he see all the rib, it is too straight; and if his line of aim be not along the centre of the rib, but the left edge of it, the stock is not properly cast off. Should the line of aim be along the right side of the rib, the stock is too much thrown off. With a gun properly fitting, the aim is instantaneous; and the sportsman, if not naturally a good shot, is greatly assisted in the field. It will thus be perceived that the objections to a stock, in shape, are various. It may be too straight or too crooked, too short or too long, and may be too much or too little cast off, or it may be cast off altogether to the wrong side. If too straight, the gun will shoot high; if too much bent, too low; if too long or short, the rapidity of aim is retarded; and if wrong

cast off, the gun will shoot to one side or other, according to the figure of the shooter. When aim is taken from the left shoulder the casting-off must be to the left hand, being the reverse of the accompanying diagram, on which the reader is supposed to be looking down on the upper part of the gun. The woodcut is drawn with the "cast-off" exaggerated for better illustration. Casting-off is little understood, and less attended to by sportsmen; and, being of great consequence in taking aim, is worthy of particular notice. It is that lateral bending of the but of the stock (generally outwards) which helps to bring the centre of the breech directly before the right eye. In simply raising a gun and taking a slow aim at any object, the neck is instinctively bent over to the right side, and the centre of the breech attained; but in the field it is far otherwise; and the aim is too readily taken from the left side of the breech, throwing the shot to the left side of the object—one reason why it is more difficult to hit a bird flying to the right than to the left. One of the best modes of trying how a gun suits the shoulder is to take aim at your own right eye as reflected in a mirror some 10 or 12 feet off. An experienced gunsmith can select a gun for a sportsman perhaps better than the latter can do for himself. He certainly can if the sportsman will tell him the



A, stock inclining to right hand; B, breech; C, barrel.

defects, if any, in his style of shooting. This is one of the reasons why it is of the highest importance for gunmakers to be themselves practised shots at game.

I may state here incidentally that were a writer on guns merely to compile a book and read the subject up, he would become utterly bewildered! I have just had occasion to consult some books for dates, &c., and, had I space, could put into ludicrous contrast the conflicting and frequently absurd statements made. Many of these have been permitted to pass without contradiction by more modern writers. Thus, of stocks, a writer gravely states that a crooked stock will cause the aim to be too high. The book is nearly a century old, and, with other obsolete works, shows how little understood guns were in former days. In this particular case height or degree of bend in the stock was confounded with high "elevation," as in a rifle sight. It being part of the business of my life to converse with sportsmen, I have not unfrequently been struck by the expression of similar fallacies, for which I could not account until the recent reading up I refer to showed me their original sources.

A gun of the proper shape may be chosen from among others very easily by the above simple means of ascertaining that it carries a correct aim to a given object with both eyes open; and with such a gun, the shooter will acquire a practical dexterity in the field otherwise quite unattainable. To be able to shoot without closing the left eye is, in my opinion, the perfection of that dexterity; giving a complete command over the motions of the object aimed at, and also over the use of the second barrel.

It will therefore be perfectly plain that if this opinion be correct, the gun must exactly fit the shooter in length and bend. As an illustration: How does a man drive a nail? Certainly not by closing one eye and looking along the hammer; but with both eyes open, he mechanically balances the hammer, and strikes instinctively, never, if accustomed to the use of the tool, missing his aim.[1] It is the same in shooting; the gun must be rapidly thrown up to the shoulder, the head well up, the eyes fixed on the object only; the gun must be left entirely, as it were, to take care of itself; and at the moment the gun is

[1] A kindly and genial critic, in a laudatory notice of the second edition of "Shooting Simplified," taking exception to this reasoning, put the following question:—"How does Mr Dougall hammer a lively flea?" The critic's argument was that my reasoning does not fairly apply to objects in motion (I write from memory); but I submit that if any one will try to hit any moving object, not to mention "a lively flea," with a hammer, keeping one's eye closed all the while, he will find it much more difficult to do so than with both eyes fully open and the hand following at once vision and nervous impulse. I am free to admit that this ingenious and good-hearted critic caused me to go cautiously over all my ground by his jocular and yet pertinent and applicable reasoning. While on the subject of criticism, I have seen it hostilely advanced that I claim the invention of shooting with both eyes open. A more ridiculous and unfounded charge was never made. On the contrary, I have always given my own case as an encouragement to bad shots, having, by the advice of Mr. Prevost Wickham, adopted that system and been converted from a miserable shot at flying objects into a good one several years after I had arrived at manhood. Being the son of a gun-maker, I had shot from boyhood, and doubtless had acquired a bad and slow system from firing at targets with the left eye carefully closed. Let any sportsman practise so at targets, and then he will find the bad effect the first time he goes after game. "Two eyes" *versus* "one eye" aiming was warmly discussed in the days of our grandfathers.

known to be in its position, the trigger is drawn, and the game falls simply because the gun, like the hammer, suits the user, and, accompanying the eye, follows the flight of the game. By this mode also, game are generally killed dead at once, and the disagreeableness and loss of time in following wounded birds and hares are avoided: in particular, the letting away of wounded hares is prevented—at all times so annoying, and in the eyes of good gamekeepers an unpardonable offence on the part of the young sportsman. The invention of the stereoscope and other advances in optical science have completely demonstrated the correctness of this argument. It is one of the greatest gratifications to any author guided by a spirit of truth, to find, as is always the case, that ideas which he has advocated and which may have been coldly received, always gather strength as time goes on. Many sportsmen will not believe in the superiority of the "two-eye" system of shooting, and for rifle-shooting it is treated with absolute ridicule. I have been told that in the army it is not even permitted, let the results in shooting be ever so good. Yet I have more than once, although not pretending to be a great rifle shot, taken a rifle out of its owner's hands, and although I had never handled the weapon before, hit the *dead centre* at the first shot and this with both eyes open. In fact, this was deemed so impossible that, on one occasion, a man was placed upon each side of me, to see that I did not close my left eye. This was some sixteen years ago, and quite recently in a similar manner I made better shooting, with a small-bore match rifle, at 200 yards, than did its

owner, he being one of the best Wimbledon shots, and a frequent prize-winner, and I having never seen the gun before. I make no pretensions to being a superior rifle shot, and only record this in advocacy of the two-eye system. At very long ranges the advantage is self-apparent. If it be really true that soldiers are constrained by peremptory command to close the left eye in taking aim, I respectfully yet advisedly submit that it is a great mistake. By doing so a great part of the value of the increased range of rifles is neutralized, and especially in distant skirmishing the binocular system would be found of the first importance.

It cannot be sufficiently impressed upon the reader that it is to binocular vision we owe our power to judge distances. With one eye indeed we can form some idea of relative distances, for instance while travelling in a railway carriage. In this case the rapid motion quickly changes the respective positions of objects situated on the various planes. The near objects appear to pass distant ones very quickly, the distant ones to pass still more distant very slowly. These all form various angles, through motion, nearly equivalent to the convergence of the optic axes when we remain stationary. If a bird then be crossing a one-eye sportsman at twenty yards distance, he will have a certain power of judging its distance, but only by the comparative rapidity with which it is passing more distant objects. If at fifty yards, he will have the same comparative means of judging. But these extraneous means can never be as valuable as the innate power of binocular vision, by which the sports-

man is enabled to control his aim, keep his gun travelling with the bird, and otherwise generally grasp as it were his whole purpose. The moment he closes his left eye he must, to be sure of killing, pull the trigger, otherwise, unless he aim in front, almost to a certainty shoot behind. The two-eye sportsman never needs to make a pause at all, he never loses sight of his bird for an instant as the other does, but keeps his gun in equal proportionate motion with the bird, and pulls the trigger at what his judgment tells him is the proper instant. He always knows whether or not he has struck his bird, while, on the other hand, the one-eye man very frequently is ignorant whether he has killed or not.

I have no desire to write dogmatically, seeing that many persons have peculiarities in vision, by which they cannot use a stereoscope at all, and probably these could never use both eyes in shooting. That is their misfortune, but in no way militates against the superiority of the two-eye system as a general rule. Some men, for instance, have the focus of each eye of quite different lengths. To such I cannot pretend to offer advice. I am aware that spectacles are specially made for such cases, not for shooting, but for general use. Without the use of spectacles it might probably be best to shoot solely from the eye having the longer focus. This digression, however, more particularly refers to the bearing of the science of optics upon this subject.

In No. 92 of that excellent periodical, *Once a Week*, (Saturday, March 30, 1861), will be found an article entitled "Ocular Stereoscopy," signed D. P., which

indirectly bears upon taking aim, and the perusal of which is recommended to all inquirers. Let us quote one or two short passages:—

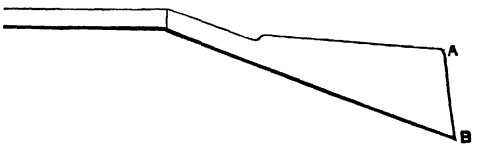
"Binocular vision, then, or the seeing with two eyes, is a most important element in the faculty of sight. To this we owe all our real sense of distance or relief. . . . To many it may seem rather paradoxical to declare that monocular (one-eyed) vision is destitute of any real sense of distance. . . . Place upon the table an empty, small-mouthed phial, and, taking another similar bottle full of water in one hand, shut either eye and approach the phial upon the table; then, without any searching motion, stretch your arm quickly out, and pour the water from the full bottle fairly into the other. In doing this, although you may not be absolutely unsuccessful, you will not fail to be conscious of a difficulty in judging distance, which disappears immediately upon opening the other eye; plainly proving that judgment and experience, without any optical sense of relief, were guiding your first efforts. A similar uncertainty will be experienced in endeavouring to approach and snuff a candle with one eye shut." It is the "judgment and experience" part which misleads the "one-eye" advocates. Through great practice they do shoot well, and therefore insist upon others throwing away "the real sense of distance," and "optical sense," which, in taking aim, are so invaluable. Men whose eyes are wide apart always excel in shooting, through plain optical causes. The nearer the eyes are, the less is the binocular power, and yet how strange it is to find sportsmen who will still

further narrow this fine provision of nature into the diameter of one retina only!

When a stock is too much bent, the muzzle is depressed —a bad fault. It is much better to have a stock rather straight than too crooked; and it is a safe rule that, in looking along the rib, you distinctly see one-third of the whole length next the muzzle, as well as the sight. This gives the shot elevation, and increases the range. The very best shots I have ever known went on this rule.

One of the most common fallacies still lingering among sportsmen is the extraordinary delusion—for it can be called nothing else—that the barrels of a gun can be too much depressed, and consequently slope downwards towards the muzzle, and yet the *crook of the stock* be correct. It is amusing to see this question revived from time to time in sporting prints, proving how hard it is to knock down a good old, respectable, time-honoured error. "My gun," they write, "shoots under; the stock suits me, but the barrels slope downwards." When a gun seems to have its barrels sloping downwards, it simply shows that it is too crooked in the stock. There cannot be two kinds of crook—the whole arrangement being merely that the barrels and stock are put together at a certain angle. There cannot be two angles in one gun. The barrels are necessarily straight, and the angle is formed in the stock—the degree of bend being entirely governed by the distance of the upper edge of the but of the stock from an imaginary line carried straight backwards from the rib. If you draw the bolt and raise the muzzle, as some do to *prove their argument*, you merely

reduce the distance of the upper edge of the stock from the above imaginary line, as would have been the shape had the *stock been made more straight in the first instance.*



The only approach to any possibility of the existence of two angles in the stocking of a gun will be found in the slope of the extreme but-end; from the "bump" A to the "toe" B. When this slope is prolonged towards B, and the gun be rested on the floor on its but-end, the barrels will stand perpendicularly. If there be no extension towards B., that is, if the line from A to B be perpendicular, they will lean slightly forward, and it is therefore hastily assumed that they will in like degree incline downwards when held horizontally against the shoulder. This is not the case, but at the same time the configuration of the sportsman's shoulder should be examined so as to govern the proper degree of slope from the bump to the toe. The mistake arises from looking upon the sportsman's shoulder as a dead flat, like the floor on which the but is rested, and the comparisons thus made are quite misleading.

The recoil of the shot is said to be less felt in a bent than in a straight stock. This is accounted for by the arch of the bend rendering the impulse less direct upon the shoulder; but as the more direct the resistance to the

backward expansion of the evolved gas, until the shot is dislodged and propelled, the better, so a straight stock, not allowing this resistance to be dissipated through the form of the arch, may possibly increase the propulsion of the shot, and the recoil should be lessened by other means. Some "Express" rifle-makers indulge in very crooked stocks to lessen recoil. This is a wrong way of doing so, is very detrimental to the sportsman, and is quite unnecessary if the rifle be properly made. At one time I began to fear that I had gone too far in supposing that a straight stock might give increased propulsion. The idea was quite original to myself, and drawn from general reflection, but I now find that it had long before been noticed by writers of repute.

The wood of the stock should be hard and tough; walnut is the best. It should be well-grown, straight in the fibre at the handle. American, commonly called black walnut, would make most serviceable stocks. Unfortunately it is very heavy, although this might not always be an objection. Birds'-eye maple makes a beautiful stock, but is too scarce for general use, and also requires immensely long seasoning to get quit, if ever, of the presence of an acid which may act injuriously on the locks. Ash would form very serviceable stocks.

The mounting and locks should be carefully fitted into the wood. In shape, the stock should be thin and nicely suited to the grasp, immediately behind the locks, where it is termed the "handle." From that it should rapidly swell backwards, and acquire its greatest thickness immediately behind where the but succeeds to the handle.

The handle should never be round in form. There is peculiar art needed in treating this part of a gun, so as to keep the stock from rolling in the hand. The raised part behind, termed the "comb," should not rise too high; and, backwards to the heel-plate, the stock should be all well rounded, with no flatness on the sides. The heel-plate should be well hollowed, and nicely filed upon its outer surface, so as to fit the shoulder closely. From the fore-trigger on half-cock to the heel-plate, the average length is 14½ inches. A long stock may have less actual bend in itself than a shorter one—length being so far equivalent to degree of bend—and, in the choice of a gun, it is a good rule to take that which is rather long and straight than otherwise. That is to say, get at your exact elevation of the breech rather by length and little than by shortness and great bend. The aim and range will thereby certainly be assisted, as experienced sportsmen will testify. And here comes in one of those compromises which pervade every branch of gunnery. If you adopt a too long and straight stock to gain range, it will be awkward when birds are rising before you at short distances. In particular you will lose good right and left chances, from this reason, that you must either let the object of your first barrel go well out or probably fire over it, the birds out of which you might have got a second shot with the other barrel having in the meanwhile flown out of range. Such difficulties in arriving at a golden rule meet us in every branch of the art of shooting. Some guns are made with a projection on the left side of the stock, termed the "cheek-piece," so that the right

cheek may rest firmly upon it. This is exceedingly useful where the sportsman is thin in the cheek, or has any tendency to bleed at the lips or gums from the recoil —not an uncommon case. The fulness of the cheek-piece will be found to remedy this, and when a gun otherwise suits its owner, a supplemental piece can readily and neatly be applied to the stock, without the jointing showing in any degree.

When a man is more than usually lusty and full in the breast—which is generally accompanied with a short neck —the stock should be short and well bent; and the addition of what is termed a "pistol-handle" will be found an advantage. Under these circumstances, the heel-plate should be well hollowed, being apt to glance off the rounded shoulder, and the pistol-handle gives firmness in the grasp. It is also of use to those who cannot acquire the art of quick firing, enabling them to draw the gun tightly against the shoulder, and thereby steady their aim. It is a projection of the wood, in the shape of a pistol stock, under the handle, enabling the right hand to exert a direct backward pressure upon the gun. These pistol-handles were generally made unnecessarily large and unseemly, much beyond the real requirements. By altering the lines, I have gained all the advantages of the grasp without any such unnecessary bulk. A wooden "pistol-handle" may be fitted most successfully to rifles, in lieu of the iron projection from the strap of the guard formerly in use, the vibration of which, when the gun was fired, often benumbed the fingers of the right hand.

As sportsmen advance in life they frequently fall off in

shooting, through no failure of their physical powers, but solely because they continue to adhere to the same length and bend of stock they used in their earlier years. This is certain to injure the accuracy of aim. No distinct rule can be laid down to meet the difficulty—each individual case may require some study—but, generally speaking, the stock should, with advancing years, be made shorter and more crooked.

The fore-end of the stock should be broad and full, wide at the end of the lock-plates, and may be chequered or not in same manner as at the handle.

A few years ago a new mode of finishing gun-stocks was introduced, by doing away with the spirit varnish, and using oil instead. The latter, although apparently less finished, is by far the more expensive process, and that most beneficial to the gun in the end. The wood, continuing to absorb oil, when applied by the sportsman during the use of the gun, becomes in the end much harder, and any bruises can more easily be removed. If kept properly clean and well oiled, the beauty of the wood is also by no means lessened, although the gun may not be so showy and eye-catching when newly finished. The oil used, it is careful to observe, must be "raw," not "boiled," linseed. The latter will not penetrate the pores, but form a nasty coating outside.

LOCKS.

An essential part of a good gun is the lock, which

should be as simple as possible in its construction, but filed in all its parts to perfection. The main-spring should be lively in action, and depend less upon quantity of metal for its strength than upon width of expansion when released from its confinement, and great care in tempering.

The main-spring should have a force of not less than 10 lb., and not exceeding 14 lb., for muzzle-loaders. Under 10 lb. the percussion-cap may not explode in wet weather; and above 14lb. the wear and tear of strikers and nipples is greatly increased. Not less than 14 lb. is to be advised for breech-loaders. The scear-spring should have a power upon the scear, preventing the dislodgment of the latter from the bend of the tumbler under a pressure of at least 4 lb. upon the trigger of the right-hand lock, and 4½lb. upon that of the left-hand. If the sportsman is in the custom of firing the left-hand barrel first, then it is that trigger must have the 4 lb., and the right the 4½lb. Some nervous men must, however, have less pull, but in this case the gun should be handled carefully to prevent accidents.

To judge a good lock, draw up the striker with the thumb, and observe that there is no grating or roughness —that it rises freely with decreasing power—and that it "speaks" well, with a clear sound at half and full cock. Draw the trigger, retaining the thumb upon the striker, and observe that it goes down freely, and with increasing force.

Sometimes pulling one trigger discharges both barrels. In this case it will almost invariably be found that the

side-nail which fastens the locks has been unduly forced beyond its original full point when screwed home. By this means the transverse limbs of the scears have been brought into contact, and thus the pulling of one trigger acts on both locks. This overscrewing is most likely to take place in arid climates, and the true remedy is to file a little off the limb of one or both scears. Sometimes, however, the double discharge is caused by one or both of the triggers being too finely set, or having worn so. If one only be so, the remedy, until a gunsmith set all right, is to fire the corresponding barrel first. If both be wrong, one lock must always be kept on half-cock until after the other trigger be drawn. Some sticklers for good old rules will not unwisely say that the last advice is a matter of course, and that the rule should be made absolute.

The hammer should be so filed as to receive the thumb readily, and not easily slip from it, and upon its proper shape and quality depends its durability. The former should be such as to prevent much vibration under the shock of the percussion; and the latter be of tough stub iron. The vibration can only be avoided by a gradual lightening of the metal from the base of the striker upwards, with a fine, light, but broad catch for the thumb. Any speciality in the strikers of breech-loaders will be referred to in the chapter on these guns.

There are various shapes of locks, although the internal work is all on the same principle; but two distinct methods exist in their position on the gun—the back-action and the fore-action. The former is still applied to

common muzzle-loaders, and is in use for breech-loaders of all qualities according to taste. (See "Breech-loaders.") It is a very simple lock, easily jointed to the other parts, and having all the lock behind the barrel.

As to this or that plan rendering locks water-tight, the simple fact is that in wet weather the rain penetrates by the triggers, passing through their box, which cannot possibly be rendered waterproof and at the same time allow the free action of the triggers. The workmanship on the highest class of locks is most beautiful; and however simple the mechanism may appear, few lock-filers are able to produce the finest qualities, which in consequence command, in the unfinished state, very high prices. One pair of good fowling-piece locks, in the filed state, without strikers, and still requiring to be finished, are equal in value to two, and if rifle-locks, to three, strong, plain, double-barrelled guns, such as are used by colonists, all complete and finished as high as varnish can make them, in stock, lock, and barrel.

The safety-lock is little used. By numberless contrivances, greater safety in the use of fire-arms has been attempted, but the ruling principle is to require two distinct points of pressure to allow the lock to act; one point is, of course, the trigger, and the other has been variously placed; but the most simple and common style is to have a lever under the handle, in connexion with a tongue pressing upon, and preventing the action of, the trigger, until the lever is acted upon by the hand in firing. A spring keeps the whole in proper position, but the mechanism is delicate, and accidents seldom arise from

such causes as may not either be easily avoided, or are likely to be prevented by the use of any safety-lock whatever. In cases where the shooter is of a nervous temperament, let him have a safety-action, by all means. We must always remember that there is something in guns beyond mere wood and iron. Their use (accompanied with a certain amount of danger) is for the promotion of health in the sports of the field; and if any cause lessen the benefit received from the complete change from business or other fatigues, the beneficial results are so far lost. That to a nervous person safety-triggers must give increased confidence, and therefore enhance the enjoyment of his sport, with all the attendant advantages, is so clear as to require no argument. — (See "Accidents.")

THE PATENT BREECH, ETC.

MUZZLE-LOADERS are now so utterly obsolete, so far as the class of probable readers of these remarks is concerned, that it would be a mere waste of space to expatiate on the patent breech, nipple, and other parts of these guns and their accoutrements. With a view to keep this work within proper bounds, I prefer to cut out all obsolete matter, and devote the space so saved to other subjects, likely to be of more interest to those who desire to be *au courant* with the most recent improvements in fire-arms.

The only remark I desire to make here is, that the greater resistance of the breech to the barrels in breech-loaders the better. This is a point I have always been

most careful upon, giving as much thickness as is possibly consistent with the jointing of the several parts properly to the breech, and making that thicker, indeed, than usual. I was naturally surprised one day to see the breech of my guns described in a work on guns as being *thinner* than usual, the left-handed compliment being paid to me that I might usefully have devoted my abilities to the planning of a thick breech. I only refer to the misrepresentation as affecting my knowledge as an author, not my skill as a gunsmith, as every one who had seen my guns could testify to its utter want of truth. Of patent breeches, &c., therefore, in these days of breech-loaders, I shall treat somewhat after the manner of the Icelandic historian who penned those memorable words, "Chapter on Snakes." "There *are* no snakes in Iceland."

TRIGGERS

Should be broad, stout, long, and well curved, affording a good hold for the finger. The front of each trigger should be nearly flat, and the curve so formed that when the pressure of the fore-finger is applied, there should be no tendency in the finger to slide upwards along the trigger, but have a horizontally backward pressure. The edges should be rounded, so as not to cut the finger in firing, and they should be set well separate. For nervous persons, who have any hesitation, under the excitement of shooting, in choosing the proper trigger, the right hand one may be chequered, thus giving a distinguishing

mark; but this had better be avoided, as in a heavy day's shooting it irritates the finger. Some sportsmen cannot shoot without injury to the fore-finger by its coming in contact with the rear of the right trigger when in the act of discharging the left barrel. The repeated blows swell the finger and cause great pain and annoyance. It may be useful to all such to know that this mischief can be entirely obviated by hanging the right trigger on a hinge, which permits it to move forward freely on pressure from behind, while in no manner lessening its efficacy in the discharge of the gun, and I strongly recommend the improvement to the numerous sportsmen who suffer from this cause. Care should be taken in having the triggers always nicely oiled and playing freely in their box, so as to act with ease. Upon this and their proper adjustment, what is called the "speaking" of the locks, depends in a great degree, so that the finest locks are frequently considered inferior, solely through the triggers not playing freely. The guard of the triggers, termed the bow, should be rounded and rather thickish at the edges, and have no improper projection likely to injure the middle finger in firing. The rear part of the guard strikes and painfully affects the middle finger of some sportsmen, who consequently have to wear an india-rubber protection. At first sight one might suppose that a low sloping bow would be the most pleasant, yet the very reverse is the case. A stout bow, coming away from the stock at nearly a right angle, will, however strange it may appear, strike the middle finger with least force of impact! The primary causes of some sportsmen being so affected at all are—the

RECOIL.

THE recoil of a gun is caused by the expansive power of the powder being universal, that is, in every direction, consequently there is the same amount of force exerted upon the breech, and from it along the stock upon the shoulder, that there is upon the charge of shot; and were the powder fired in a chamber of exactly the same strength on all sides, the result would be the escape of the evolved gas through each side alike, by bursting or otherwise. The charge of shot presenting, while in a state of rest, a greater or less obstacle to the escape of the gas, until that obstacle is quite overcome, the pressure tends equally backwards and laterally as well as forwards—this is termed the recoil. It will therefore at once be perceived that all guns fired with common gunpowder must have some recoil, although in some it may be so small as to be hardly perceptible, according to the amount of *vis inertiæ* in the gun itself and shape of the stock (see "Stock"), but though not felt by the shooter, the recoil does exist the same in all guns of equal calibre when equally charged, and it is only by the greater amount of this *vis inertiæ* that it is not perceived, or is exhausted. If, again, they be fired with any of the new explosives, and literally there

be no recoil at all, its absence is an evidence of the use of that explosive being highly dangerous. This may appear a strange statement, yet such are the paradoxes in gunnery. There are other elements which enter into the question of recoil, but the above is sufficiently explicit for a work of this popular kind. If it were desirable to bring the matter into figures, the recoil would be measured by the weight of the fire-arm inversely to that of the charge of shot. The weight of the shooter must necessarily be taken into account so far, and also the firmness of his grasp of the gun, and of his pressing it against his shoulder. The yielding of his body to the blow is also to be considered, hence a gun fired nearly or quite perpendicularly upwards from the shoulder, as in rook-shooting, or at ducks flying overhead, is always felt to recoil. This is because the shock is in the direction of the ground, which cannot yield under the feet to lessen the force, whereas in common shooting the whole body bends backward. It follows that it is of prime consequence that a sportsman learn to hold his gun firmly against his shoulder in firing, which is advantageous in every possible way. Various attempts have been made to reduce the shock of the recoil by putting springs into the stock, with a moveable piece next the shoulder; these have failed in producing any real benefit, and may be dismissed as practically worthless. The action of the discharge is far too rapid to allow the springs to come usefully into play.

When the barrels are too thin at the breech, the effect of the lateral expansion causes a great vibration, giving the shooter a shock which is not the same as a simple

recoil, but is often mistaken for it. From the confusion arising from these two kinds of recoil, many erroneous opinions have been formed as to its cause. Thus, wide thin barrels, although weighing more than narrower and thicker ones, will vibrate severely with the same charge of powder and shot, and this recoil, being lateral, gives a very great shake to the nervous system, and is very likely to produce headache and render the aim uncertain. In fact, such a piece is worthless, and the greatest prudence should be exercised, in choosing a gun, to avoid one with this fault, which is the more apt to escape notice because a direct recoil against the shoulder is not observed, and it is only when the gun is brought fairly into use that the repeated shocks from the discharges begin to exert their effect upon the nervous system. The effect this nervous derangement has upon the aim is very great; shot after shot is fired, apparently in the right direction, and the sportsman is surprised to see the game go away uninjured, and supposes that his powder is damp, or that some other mysterious cause is at work to destroy the force of the shot—the truth being that he is firing without aim.

One common opinion is that recoil is caused by the point of ignition not being quite at the rear-end of the charge, so that any powder behind that point is supposed to shoot backwards. So far is this from being the case, that it has been proved by a series of experiments made at the instance of the Board of Ordnance that the recoil is least of all when the powder is fired exactly at the centre, that is, equidistant between the breech and the wadding in front. Not being in possession of the details

of these experiments, I submit in their place those conducted by the French Government for the same end, by which it will be seen that the situation of the touch-hole has very little, if anything, to do with the recoil. The experiments were made by M. Le Clerc, gunsmith to Louis XVI. The barrel used was 30 French inches in length, weighing, with the board to which it was fixed, 28lb. The charge was one drachm twelve grains powder, and one ounce eighteen grains No. 4 shot (probably these were Troy weights). The target was a sheet of paper 20 inches by 16, placed at 45 paces. Two kinds of wadding were used. The result of the whole is given in the following tables:—

FIRST SET.

WADDING OF CARD-PAPER.

	Discharge	RECOIL. Feet.	Inch.	Lines.	Mean.	No. of pellets thrown into the mark. Mean.	
Touch-hole close to the breech-plug.	1	1	0	3		36	
	2	0	10	3	0 11 6½	14	27
	3	1	0	3		31	
Touch-hole two lines from the breech-plug.	1	1	3	9		45	
	2	1	2	0	1 3 0	33	34
	3	1	3	3		26	
Touch-hole six lines distant.	1	1	0	10		38	
	2	0	11	11	1 0 6	20	25
	3	1	0	9		18	
Touch-hole twelve lines distant.	1	1	1	7		27	
	2	1	0	3	1 1 0½	17	26
	3	1	1	4		35	

Mean of all, 28.

Extremes—0, 10, 3, and 1, 3, 9.—Mean Recoil—1, 1, 0.
Extremes of pellets in mark—14 and 45.

SECOND SET.

WADDING OF HAT.									
	Discharge.	RECOIL.						No. of pellets thrown into the mark.	
		Feet.	Inch.	Lines.	Mean.			Mean.	
Touch-hole close to the breech-plug.	1	1	1	1	1	2	4¼	40	51
	2	1	4	0				78	
	3	1	2	0				37	
Touch-hole two lines distant.	1	1	0	7	1	2	0¼	44	41
	2	1	2	3				40	
	3	1	3	3				41	
Touch-hole six lines distant.	1	1	3	3	1	3	1	32	45
	2	1	2	9				50	
	3	1	3	2				53	
Touch-hole twelve lines distant.	1	1	4	5	1	3	1½	60	44
	2	1	2	7				21	
	3	1	2	5				51	

Mean, 45.

Extremes—1, 0, 7, and 1, 4, 5.—Mean Recoil—1, 2, 8½.
Extremes of pellets in Mark—21 and 78.

I had long been of opinion, from my own experience, that the point of ignition had nothing to do with the production of recoil, and it was a source of much personal gratification to fall in with the foregoing tables. But the question, which has been a cause of much contention among gunsmiths, is still further set at rest by the fact, that the Prussian needle-musket, the freedom of recoil in which is a matter of boasting on the part of the inventor, actually has the charge of powder kindled in the very front, so that, if any effect were produced by the point of ignition, the recoil would be the greatest possible. The

consideration of this subject led me in the year 1858 to institute a series of experiments, which ended in the invention of the "Front Ignition Gun-breech," for which I took letters patent in 1859. By this mode of ignition the gun outwardly appears the same as others, but the flame of the cap is driven through a steel tube, lying in the axis of the barrel, to the middle or front part of the charge, as may be desirable.[2] The most remarkable results, far beyond expectation, ensued. Not only was recoil almost entirely done away with, but the projectile force was found to be enormously increased. Altogether, it is hardly possible to over-estimate the superiority of front-ignition over the usual mode. Having turned my attention to the improvement of breech-loaders, I necessarily neglected this invention, which, indeed, was too late in the age, at least for use in sporting fire-arms, just when these breech-loaders were coming into use. I learned enough, however, to be convinced that, until front-ignition be adopted, the full power of gunpowder must remain unknown; and let mechanical appliances, such as the steam-hammer, enable us to forge cannon monstrous in size, these cannon never can properly consume their powder when kindled from behind. This is not the place to enter upon argumentative or personal matters; but I am convinced that the British Government

[2] It may interest some readers to learn that the flame of a good percussion cap, passed through a narrow tube, will ignite gunpowder at the distance of even 30 inches. Also, that unless there be a wadding or other obstacle in front of the powder, the flame will pass clean through without ignition, yet kindle another charge of powder, properly wadded, further on in the tube.

must, sooner or later, introduce this system into heavy ordnance. Their attempts to solve the problem by using immensely large-grained ("pebble") powder are all in the wrong direction. So much of this "pebble" powder is blown away that, in saluting the Shah of Persia at Portsmouth in the summer of 1873, a discharge of this explosive tore up the bulwarks and deck of a yacht lying at some distance, and severely wounded several individuals. A large part of the whole charge of powder acted like as much grape-shot! By front-ignition every grain would have been burned in the cannon.[3]

To return to the subject of recoil, it must be understood that the previous remarks apply to barrels in a perfect and clean state, and must be modified so far by circumstances, not, however, in the slightest affecting the general principles. Thus, if a barrel is improperly bored, the recoil will be greater; the same will take place when the barrel becomes foul from repeated firing or other causes,

[3] It has been found that ordnance, built theoretically to consume 150 lb. of powder, only burn effectively 120 lb. There are therefore great useless weight and expenditure. It was, I believe, by means of front ignition, that Sir Joseph Whitworth propelled a cannon-ball *six and three quarter miles!* In an interview which I had requested with him on this matter, he stated that he was not aware of my patent having been taken when he took out his several years afterwards. I considered myself entitled to and asked an acknowledgment from Sir Joseph, that the invention is mine; but this he declined. The facts and dates, however, speak for themselves. So far as I can judge by the description in the newspapers, the Macomber gun—for which a range of no less than nine miles is claimed—has the point of ignition well forward. This—if I am correct in the assumption—is another proof of the value of my invention, which, as too frequently occurs, has been quite profitless to myself.

the resistance to the dislodgment of the shot being thereby increased. It is particularly to be noted that recoil does not imply a diminution of force in shooting; hence most gamekeepers from experience prefer a heavy charge, and have a common and correct impression that a gun should be felt upon the shoulder. But as the repeated shock is very trying to the nerves and hurtful to the aim, the just medium is that charge by which as much strength can be attained as possible without perceptible recoil. In finding out this the truth of the above remarks will be perceived by the fact that the amount of powder may be very much increased without adding to the recoil, while a very small addition to the shot, by increasing the resistance to its dislodgment, will at once be felt. This of course will only be perceived after the point of perceptible recoil has been reached, and until then may be much modified. Under the excitement of shooting at game recoil is much less felt than in firing at a mark. Many first-rate and experienced game-shots cannot stand the shock of firing at a target. This has been scientifically explained by the theory that, in firing at a mark, the shooter's whole body is in a state of rest, and therefore is easily acted upon by the shock of the discharge. In the field, on the contrary, the body is supposed to be in more or less action; this action, meeting and counteracting the gun's shock, neutralizes it. It is further argued, that before the discharge can be felt there must be a surplusage of recoil beyond what is necessary to reduce the whole body of the shooter to that state of rest which he enjoys when firing at a target. The argument

is ingenious, but is not demonstrative. Other contingencies, such as wounds, are not felt under excitement, when the above argument would not apply.

The true causes of undue recoil being want of *vis inertiæ* and overcharging, especially with shot, and these being increased by improper boring, or the barrel being foul, the remedies are: due caution in the choice of a gun at the first, particularly in observing that the barrel has the proper swell in the last ten inches towards the breech—something after the style of the Eddystone Lighthouse—and has no improper inequalities in the bore beyond what is necessary in giving due friction and relief; proper care in loading adjusted to the bore and weight of the gun, and in keeping the barrel free from leading and other foulness. In breechloaders, it should be ascertained that there be as much solidity as possible in the breech in rear of the barrels. If, notwithstanding due care in these particulars, a gun still "kicks," as it is commonly termed, there must be an inherent fault in the barrel being too light towards the breech, however heavy forward; and the recoil may be not so much a direct impulsion upon the shoulder as a vibration, which is still worse. When, through circumstances, the young sportsman may have for a time to use a gun which recoils, it should be kept clean, and a small charge of shot be used, and it is wonderful what even $\frac{3}{4}$ oz. of lead will do in the way of killing game. The wadding over the shot in breech-loading cartridges should also be as thin as card-board, and that over the powder thinner than usual. Guns, however, have been known to recoil without any apparent

cause, and to absolutely refuse to be cured of this vice under any treatment. In fact, it might be jocularly advanced, that guns seem to have a way and character of their own, much as a sailor thinks his vessel a sentient being. One of Joe Manton's foremen made a nice little single-barrelled gun for his son. It was, as may be supposed, rather a neat weapon, but kicked fearfully, no variation of charge or boring improving it, and it is now kept as a curiosity in its way. I have handled and examined this gun, and, like hundreds before me, could discover no cause whatever for its very wilful and most reprehensible behaviour. The barrel, patent breech, and other parts, were of the most regular forms, the workmanship was as a matter of course, thoroughly sound: where then could the mystery be?

THE "COVERT-GUN,"

So called from its shortness, to permit free and easy handling among bushes, is a variety of the fowling-piece as to length and calibre of barrel, and is a departure from the commonly recognized rules. The length of barrel is generally twenty-six inches; the calibre, 9 or 10. The shortness of the barrel unfits these guns for a slow or bad shot; in the hands of a good shot they are all that can be desired. Why they shoot so sharply may probably be from the shot occuping less of the length of the barrel, owing to its great width, so that each pellet

receives a more direct impulse from the explosion, the more especially with good elastic wadding, from the amount of friction along the barrel being less, and from the barrel containing a shorter column of air necessarily to be dislodged before the shot attains its full velocity, which, from all these causes, may thus be much increased. It is exceedingly probable, however, that the impulse conveyed to the shot is not of the same character as in longer barrels, and that therefore the admitted velocity at short ranges is not maintained to equal distance. There are some great mysteries in the nature of the velocity of projectiles, some explosives, for instance, giving a quick but short-lived impulse, of the nature of a jerk, and this can be tested by firing rifles at very long ranges, which will soon put the quality of these explosives to the proof. The discharge of shot from a short barrel may be analogous, any want of steadiness in the rifle bullet, or in the smaller pellets, doubling the work they have to do in passing through the air. Small shot, therefore, from its lightness and consequent want of momentum, will be much more susceptible of any disturbing force. Heavier balls may probably so far steady themselves as their flight goes on, their superior weight and the greater duration of flight being all in their favour as compared with the short-lived flight of small shot. Superior unsteady initial velocity may therefore be inferior in final results, except at short ranges, to a steadier although slower initial velocity, by which no vibratory, twisting, or other disturbing quality is conveyed to the projectile, but only a direct and useful impulse.

BREECH-LOADERS.

ALTHOUGH it is not probable that any reader of this little book is ignorant of the construction of breech-loading guns in some one or other of their varieties, it may not be an injudicious mode of treating the subject to go back at once to their first principles, and, putting the question of, "What is a breech-loader?" proceed to reply to it.

A breech-loading gun, then, is a weapon giving the exact same results as a muzzle-loader in the object or purpose of its requirements, viz. to discharge shot of any kind with force and accuracy, but differing from a muzzle-loader in the manner in which the gun is charged, and in several contingencies arising therefrom. This appears to be a fair logical definition of the new weapon, and we may proceed to describe the general distinctive features of the gun upon that definition, and to discuss the question of its comparative merits.

Custom habituates mankind to many imperfections and fallacies which, when in the course of time once broken in upon or dispelled by discovery or improvement, are looked back upon with surprise and regret. When we consider the purpose of a gun—that it is intrinsically a tube of metal through which a projectile is to be driven by the elasticity of a certain gas, and that much of the force of this gas depends upon the exact fitting of the projectile to that tube, or, in other words, upon the absence of windage—one would suppose that it should never have been attempted to insert the projectile by the muzzle at all. It might have been argued, "You have to

ram home, by the mere muscular power of your arm, a bullet, or wadding, or other substance; and yet you hope to be able to do this with that substance fitting so tightly, that, when the gunpowder is fired, you expect that the greater part of its strength will not escape between the sides of the projectile and the barrel. The thing is out of the question. You may as well expect to hold water in a sieve." This language, although exaggerated, if used to the supposed first inventor of a fire-arm, would have had much plausibility, and in point of fact contains a great deal of truth. Were it not that the absolute velocity of expansion of the exploded gunpowder is far beyond that of the velocity of the projectile, the latter would not acquire speed to any great degree. As it is, under the most imperfect arrangement, the shot necessarily acquires a share of the almost inconceivable velocity of the expanding gas, equal to some 7000 feet per second. But that speed is much modified by the amount of windage; and experiment has demonstrated that a 32 lb. ball fired from a cannon having ·013 inch of windage, has an initial velocity of 1401 feet; while a windage of ·253 reduces that velocity to 1170 feet, with the same charge of powder; yet this *decimal* difference in windage is practically small, when we put the whole into comparison with the dimensions and power of a 32 lb. cannon. The results, however, are immense, being a difference of 231 feet *per second!* These results will appear still more conspicuous if (always bearing in mind that increase in velocity is much less than proportionate increase in explosive forces) we put it in this form:—

that reduction of windage from ·253 to ·013 inch increases the velocity of a 32 lb. ball 231 feet per second upon 1170, being as near as may be *one-fifth!*

It is needless to pursue this branch of the subject further. Enough is shown by the above that it is a prime necessity towards procuring the highest possible results from the explosion of gunpowder, that the projectile to be acted upon fill up the tube of the barrel so accurately that there shall be little or no room for the escape of the evolved gas by its sides. Upon this fact depend most of the modern improvements in gunnery. The thick elastic wadding, referred to in a former chapter —the "Minié," or "expanding" variety of conical bullet —are both to be attributed to this desire to lessen windage. Possibly the invention of breech-loaders was originally more directed to facility and quickness in loading than to any other advantage, but whether or not, breech-loaders have only to be made upon sound mechanical principles to gain a manifest advantage over muzzle-loaders in every respect. It cannot be denied, at the same time, that the successful introduction of the common French breech-loading fowling-piece into this country has stimulated experimentation on cannon so charged, resulting in the famed Whitworth guns, and other wonders of the age. When, in 1857, breech-loading fowling-pieces first came into general use in this country, I at once saw where a great advantage could be gained by using a wadding one calibre larger than the tube, and forwarded to the *Field* newspaper a letter to that effect, with drawings, all which duly appeared in that excellent periodical, which I may

say, *en passant*, has done more than any other agent whatever for the improvement of sporting fire-arms. But, in the hurry of thought, and in that peculiar progressive attainment of knowledge which seems to attend the study of things new, I forgot that it was easier to make the tube a size narrower, in the first instance, than to fit a somewhat conical cartridge with a thick wad in the rear. In detail, therefore, I was wrong, while correct in principle, and on this principle breech-loaders, even cannon, now are constructed with their cartridge or powder-chamber wider than the barrel, when, if their mechanical fittings be correct, they must surpass in shooting powers any muzzle-loaders of similar dimensions.

A breech-loader, therefore, to repeat, is a gun which is charged, not by the muzzle, but at the rear of the barrel. By this mode of construction it is no longer necessary that, in loading, the charge be passed down the tube of the barrel, and the size of the wadding or projectile is no longer governed by the ability to ram it home easily and effectually, but by the power of the explosion to drive these forward without danger of bursting the piece or undue recoil. It follows that windage may nearly be done away with; and, to repeat again, if the gun possess other mechanical requirements, it must therefore excel in shooting powers.

There is a vast variety of these new guns before the public. So far back as in April, 1861, I saw in one room in Liege, forty different breech-loaders, yet there was one radical defect in them all—a want of locking power: or in the one or two instances where that was imperfectly

gained, the means were complicated and apt to go out of order. Facility of loading seemed to have been the ruling idea, and not the great force which English sportsmen demand, and will have. The invention is said to be originally French, and quite carries out the national character for quickness in thought and arrangement. "They manage," said Sterne, in the hackneyed quotation, "these things better in France;" but their powers of administration surpass those of producing lasting effects and solid power in mechanical and other objects. The French system of breech-loaders is that the barrels play upon a hinge situated about two inches from the breech. A moveable key or lever, passing up from below the "action" or iron piece into which the hinge-pin is fixed, has a screw working itself into a notch in the "lump," a bar of metal descending into the action from between the barrels. There is no scientific principle involved, the fitting of the thread of the rapid screw into the notch being merely a rude jamming, which the friction of every operation must weaken as the metal wears. The perpendicular face of the breech against which the base of the barrels abuts and that base are both smooth, and have no grasp upon each other. The whole catch, therefore, depends upon the lever holding firmly into the notch or notches in the descending lump. This point of grip is manifestly deficient in every essential quality. First, the lever itself is moveable, and therefore cannot give an immoveable catch. Secondly, the lines of resistance are in the worst position, for the point of grasp being much under the barrel, is necessarily subjected to

severe leverage on the gun being fired, exactly as when you wish to tilt over a chair most easily, you catch or push it by the upper rail of the back, and not by the seat or centre of gravity. Thirdly, it presents no hindrance to the barrel rising at the breech at the moment of firing, and consequently dipping at the muzzle. There is the best reason to believe that every breech-loader on this construction, however tight the mechanical fitting may appear, does so rise, and the reason is plain—that the barrels, of necessity, leap upwards at the breech from the reaction against the horizontal part of the action. The vibration extends itself by a natural law in the direction of least resistance, and the hinge being under the line of fire, the barrels strain, as it were, to revolve around that hinge. Against this revolving tendency the catch of the moveable lever is not sufficient, and this want of security and the general elasticity of all the metal in effect permit this revolution to take place in a slight degree. However slight this may be at the breech, the effect is serious at the object of aim. The hinge-pin being at the distance of a little more than two inches from the breech, should the latter rise only 1-64th of an inch, the muzzle of a barrel of thirty inches will fall some 15-64ths, or nearly a quarter of an inch, and that deviation will go on at the same ratio up to the thirty, forty, or fifty yards at which the object of aim is distant. To compensate this drooping it has been customary to make the stocks straighter than those used in muzzle-loaders, so as to gain elevation, thus making the gun awkward to wield, in order to compensate another fault.

But this is not all, for this tendency to revolve upon the hinge, not being checked in the first instance, necessarily throws a severe strain upon the mechanism; and, despite every attempt by means of wedge-shaped fittings and other contrivances, the parts become loose, and the gun loses that solidity which is the first essential shooting quality. So certain is this deterioration in the jointing, that it is quite common to provide for it by making the parts so that new steel facings and other means of repair can be put on when required; and the maker points triumphantly to this provision—forgetting that he is, in fact, thereby admitting that the gun is built on a false mechanical construction. What maker of a muzzle-loader, on the other hand, would complacently point out how he had provided for some certain rapid tear and wear by this or that contrivance, and would not at once make his gun so that this imperfection be remedied?

This disjointing, then, has been the cause of many breech-loaders shooting badly, and the great results which might have been gained by this superior system of loading have been lost, and the breech-loading principle has been, in consequence, not unfrequently most unjustly condemned as being deficient in shooting power. It is far from being denied that good shooting is had from almost all the recognized varieties, especially when the guns are quite new, but it is only gained by heavy charges of powder, as compared with muzzle-loaders, with all the necessary recoil and more rapid tear and wear. The obvious cure for the fault was, first, to inquire into the difference between a muzzle and a breech-loader; to learn wherein this differ-

ence affected the solidity of the gun, and if possible to assimilate the two. The excellence of going back to first principles, which so many affect to despise as being beneath their dignity, would then have been seen. A muzzle-loading gun is held in the stock, first, by hooks on the extremity of the barrels, which are received into corresponding recesses in the false breech; and, secondly, by passing a bolt through a loop on the barrels at some distance from these hooks. This bolt is frequently very loose and imperfect, yet performs its work notwithstanding; and it is evident that the breech-hooks form the real grasp—the bolt doing little beyond holding them into the recesses. What sort of shooting or security should we expect from a muzzle-loader held by the bolt only, its breech and the false breech being alike smooth, and taking no hold of each other? Yet this practically is the position of the breech-loaders which form ninety out of every hundred in use, and of nearly all the self-locking snap-guns, in consequence of the absence of a firm grasp of the stock upon the barrels. The remedy—had the thing been properly inquired into—is as apparent as the fault, viz.: to obtain an equivalent to the hooks and recesses of the muzzle-loader's breech; using the bolting part to interlock the barrels and stock, and not requiring of it to be both the grasp and bolt, and be provided for the tear and wear produced by its being overtasked. In plain terms, then, what was wanted was, that the barrels should be firmly held at the extreme breech end by the solid stock itself, and not by an instrument or catch merely moving in that stock, and not forming an integral part of it.

Notwithstanding the perfect clearness of this reasoning, and of the complete proof of its correctness from prolonged experience, the tendency of late years was to run into still greater error, and to sacrifice all mechanical advantages and correct shooting powers for increased speed in loading. This speed in loading was now estimated apparently by decimals of seconds; and every other week we heard of new self-locking guns, as being a vast improvement—the fact being, that the self-locking mechanism was not unfrequently most ineffective. This system places the closing of the gun beyond the power of the sportsman to exert his own faculties upon it, and by one of the best recognized mechanical laws makes that easy to open again exactly proportionally as it is easy to shut. All these self-closing guns depended upon steel springs to hold stock and barrels together; and steel is the most treacherous metal in gunnery, as witness Sir William Armstrong's parliamentary evidence on his own cannon, evidence which the further experience of a dozen years has fully justified.[4] Exactly as a gun is a self-closer it demands the higher mechanical conditions. The user cannot at any time know,

[4] I take credit to myself that, at the time when nearly every authority was carried away by the fancied superiority of steel over iron, I then, and ever since, have maintained a steady opposition to the use of steel as the material for the barrels of all small-arms save narrow-bore rifles and pistols. In the public press, and in private—at great risk to professional reputation, through not appearing to keep pace with the advancement of the age—I have reprobated the use of steel; and time has justified my opposition. In like manner, steel springs should be avoided as much as possible in breech-loaders, especially if the whole grasp of the breech rests upon them, as in some snap-guns.

before firing, whether or not the internal mechanism, at all times beyond his reach of observation, is still effective. In a word, in using such a gun, he deprives himself of his own control over it, and trusts to agencies beyond his means of manipulation. It is notorious that many of these guns so "spat" at the breech, that after a day's shooting the sportsman's face was frequently blackened over; and it was exceedingly difficult to regulate their shooting correctly, owing to their inferior solidity and weaker grasp at the breech. On the other hand, it is only fair to say, that where expense is no object, as involved in the tear and wear of snap-guns, they are quick and pleasant to handle. Much also depends upon the solidity of the cartridges; should these remain quite unaffected by the discharge, "spitting" cannot occur. I am informed that letters frequently now appear in the sporting papers, complaining of cartridges splitting at the rear. Presumably, this may be attributed to the opening, when fired, of snap-guns, now subjected to some years' wear. I have carefully examined the cartridges as now made, and cannot find any inferiority in their construction or material.

This is not the place to enter upon personal or commercial matters and I should much prefer in this treatise to sink my identity as a gunsmith altogether, were I not induced to believe that practical experience, honestly expounded, must have weight with impartial readers. I will only say, therefore, that the "Lock-fast" system of breech-loaders, with which my name is inseparably connected, is constructed so as to give the old interlocking of the muzzle-loaders to the new weapon. In the Lock-fast it

is the stock itself which holds the barrels in their place: the mechanical movement is merely the agent to bring the stock and barrels together. The system also first demonstrated the great fact that the barrels should be held down at their extreme rear, and all genuine progress has since been made on this most important principle. If I knew of a better gun, I should at once adopt it; and feel assured that no unprejudiced reader will blame me for thus frankly stating most honest and conscientious opinions, and the results of experience. Beyond this, however, I will not go, nor carry the war into the camp of the enemy on matters of detail, although this would certainly be *commercially* justified by the thousand-and-one ridiculous mis-statements which have been set afloat against the Lock-fast breech-loaders, but which each succeeding season sends to the limbo of untruths. It is a fair logical inference, that the complete success of any invention against bitter opposition is the best proof of excellence.

It is right to explain that some "Snap" guns have now their catch at the extreme end of the barrels, and are therefore, so far, not open to the objections to all breech-loaders where that catch is at any distance from the breech. They cannot, therefore, until considerably worn, dip at the muzzle when discharged. The very extended experience I have had and am daily having with greatly improved guns on this system, quite justifies me in recommending their use where rapid firing is a prime object. In pointing out the various good or bad qualities of any fire-arm, I would earnestly desire

my readers to bear in mind that I write impartially, and indeed can have no selfish purpose to serve. All systems are open to all makers, and there is no difference in costs or profits. The whole question must be viewed from the point of intended purpose, if for rapid firing, for heavy charges, and so on. My readers may also bear in mind that I write from two points of view—those of the gunsmith and the sportsman. I would much prefer sinking the former altogether, but this is impossible. I cannot deprive myself of my whole identity and course of training and reflection. What I specially deprecate is any belief that I can have any commercial or professional motive in expressing my opinions. None such can exist, for all the various systems of breech-loaders are quite open to all makers.

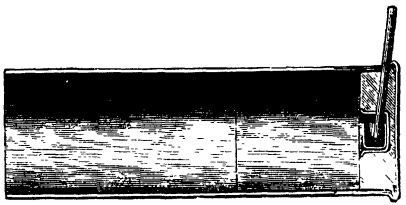
The levers operating on the mechanism of snap-guns are variously placed—above, below, and at the side of the breech or action: I have found no superiority in any one of these positions. The sportsman should be entirely guided in selection by his own tastes or ease in handling. The throwing up of the barrels after placing the cartridges closes the gun without any other agency, and the lever is only used to detach the internal grip and not to give it. Its position therefore, is, I repeat, entirely a matter of taste or convenience.

Breech-loaders are not made of every running calibre as muzzle-loaders. Their numbers are governed by the calibre of the cartridge, and are always even—4, 6, 8, and so on to 20. Neither do these numbers always convey the exact dimensions of the bore. I have already men-

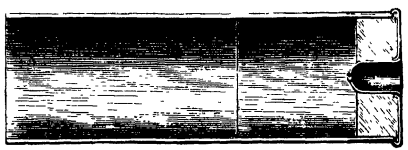
tioned that I was the first to suggest that the calibre of the barrel should be one size less than the cartridge or wadding. Thus a 10 has an 11 calibre, a 12 a 13 and so on. But besides this the 16-bore breech-cartridge, a good size, is really a small 14, from the reason that we have retained the French denomination, which is larger than ours. A 12 cartridge is a full 12, because that bore was first introduced in England as generally understood, hence the number denotes nearly true English calibre. The smaller bores, especially the 16, were and are the favourite Continental sizes. With these preliminary remarks, the reader may consider that, so far as the mere dimensions or weight are concerned, he may treat breech-loaders as in no way differing from muzzle-loaders, and make up his mind accordingly in the choice of a gun for any specific purpose, or to suit his strength and sport.

There are two varieties of cartridges in common use, leaving out of consideration some minor kinds of no interest to the sportsman. These are, the "pin," and the "central-fire." Both are central-fire so far as the point of ignition is concerned, the difference lies in the means by which percussion is brought to bear on the cap. This is a sectional diagram of a No. 12 pin cartridge. A pointed pin of hardened brass wire is inserted at right angles into the cartridge, with its point lying well into the cap, which sits sideways towards the gunpowder. Room is made for the pin by a notch being cut in the end of the barrel, a small projection upon the face of the break-off coming behind the pin and completing the orifice when the barrels are closed for firing. When the hammer falls

it strikes the pin and drives its point into the fulminate of the cap.



In the central-fire cartridge, as will be seen by the diagram, the cap is inserted from behind, and it is ignited by the immediate impact of a horizontal or oblique plunger, which in its turn has been struck from the rear by the falling hammer.



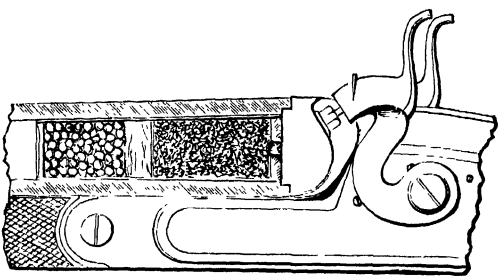
These cartridges are so well known that it might appear superfluous to describe them, were it not, in my opinion, proper to make a few remarks upon their comparative merits for the instruction of young sportsmen and residents in distant countries. Few save gunmakers can understand how much information is sought for on such apparently trite matters.

The pin-cartridge gun has superiority over the central-fire in so far as it has greater simplicity of parts, no delicate mechanism to extract the exploded cartridge, which can be drawn out by exercising pressure on the pin, and by certainly having less recoil when heavy charges are required. The gun is, therefore, on the whole, well adapted for outlying places and rough work. It is right to say, that the reduction of recoil is gained by the slight escape of gases, the pin-hole acting as an escape-valve. Some sportsmen may object to this as a loss of power. This is an old and still open question.

The central-fire gun is undoubtedly a step in advance; but, as in everything else where there is more to be done automatically by the mechanism, it is more delicate in construction. Perhaps I should rather say it was more delicate, for great improvements have been made in the self-working extractor. When first introduced, these guns were "cracked up" for business purposes, and, at great temporary injury to my pocket, I was most cautious in adopting the system—a prudence justified by the numerous fatal accidents which occurred at that period through their then imperfect construction. Great prudence should be exercised by all gunsmiths, and very rarely indeed do accidents occur with guns sent out by first-class makers. For instance, no accident whatever has occurred, to my knowledge, with any gun made in my own business, by myself or predecessors, extending over a period of about 120 years. I have no doubt but that many respectable firms can make similar statements. As it now stands, the central-fire gun is the highest class fire-

arm known; and when I come to treat of Express Rifles, ample proof will be given of the truth of this assertion.

Their superiority over the pin-gun lies in the completeness of the closure of the rear of the cartridge through the absence of any orifice to admit the pin in the cartridge itself, or in the barrel to admit the pin. A well-made central-cartridge, supported in its turn by the discs of a Patent Lock-fast gun entering the barrels in its rear, presents the nearest approach to the breech of a muzzle-



loader. In the above diagram the disc is shown in white, and projecting into the rear of the barrel, quite closing it up. The barrel is shown in section. It will be seen that the barrel cannot possibly tilt up when the gun is fired. Again, in inserting a pin-cartridge, the notch in the barrel to receive the pin must be looked for, often abstracting the eye when the sportsman is required to watch his game. The central-cartridge requires no such adjustment, and may be inserted blindfold. No flash at

the breech on firing is possible (if the cartridge do not split), as happens with pin-guns, and this is of value in some kinds of shooting. From the same quality, it follows that there is no escape of smoke, so that there is much greater cleanness in use. The exploded cartridge is also most readily removed, having been already drawn out so far on opening the gun by the action of the powerful extractor, which, properly made, with the limb extending over one third of the circumference of the barrel, cannot but force the cartridge outward, the sportsman's hand completing the extraction. If the limb be less than one third the cartridges will very frequently get behind and cause no end of trouble. While the gunsmith may have done his part properly, however, there may be a want of sufficient fulness in the rim of occasional cartridges for the extractor to operate upon. In this case the cartridge will be slipped over, and thus get within the extractor—a most annoying mishap, for there is generally no remedy but to take the barrels out of the stock, and then take the extractor out of the barrels, which latter process can only be done by unscrewing nails and delicate handling in removing and replacing. The unique extractor I use can be taken out and replaced as readily as one opens and shuts a clasp-knife. The extractor is a rod of steel (moving in a tubular passage in the "lump" under the barrels and in their plane,) with a cross-piece at the extreme rear-end. Each side of this cross-piece extends one-third of the circumference of the interior of the barrel, into which it fits and forms a factitious part when the gun is closed. On opening the gun the extractor slides backwards,

and necessarily forces out the cartridge so far with it.

One very great advantage the central fire system possesses is that of permitting the gun to be used in case of need as a muzzle-loader. This is effected by fitting solid metallic breeches in the barrels, removeable at pleasure. When the gun is to be used as a muzzle-loader these breeches are inserted in the barrels, the strikers are removed, and in their places are screwed a pair of nipples. A minute orifice, exactly in the centre of the removeable breech, is sufficiently close to the lower end of the nipple to form an almost continuous tube, and make ignition certain. Of course common percussion-caps are used on the nipples. These factitious breeches are peculiarly available in guns fitted with discs, as these so completely fill up the rear of the barrels as to make the most perfect closure, and prevent any regurgitation of the gases.

Pin-fire guns have also been so fitted with breeches, and indeed were so at their very first beginning in France; but the communication with the outer percussion-cap is through a delicate tube or nipple, incapable of standing any amount of work.

I have endeavoured to give a fair statement of the comparative merits of the two systems, and it is only proper to add that for ordinary fowling-pieces the central-fire has not yet succeeded in driving the pin entirely out of use, the latter having powerful advocates among some experienced sportsmen. The central-fire gun has much more mechanism, and if properly and carefully made, the price must be enhanced; but, these being granted, the

sportsman is undoubtedly furnished with a more scientific weapon, and as time goes on, the pin-cartridge will doubtless disappear altogether.

Breech-loaders can be made with either fore-action or back-action locks as taste may dictate. The greater number are made with the latter, which have the advantage in strength, while a lighter gun can be made with the former. These differences are, however, so very little in degree, that, save in rifles, which certainly should have back-action, the choice of locks calls for no lengthened remark. The fore-action (as in preceding diagram) gives a certain style and dignity to the gun, and the handle of the stock is left more entire by reason of the shorter strap of the breech. I have used with success a short back-action lock, running on new lines with the "action," and also having the short strap to the breech. This system forms a remarkably strong gun.

For a few years past, there has been in partial use a variety of breech-loading lock, termed "rebounding." This means that the hammer, after having delivered its blow upon the cap, rebounds to half-cock. The lock, therefore, unless put on full-cock by the hand, is always on half-cock, and one of the claims for this variety is, that the operation of replacing the cartridges is greatly simplified and facilitated. To use a military term, several "motions" are done away with in handling a gun with rebounding locks. This invention has been greatly improved upon recently by Mr. John Stanton, a first-class lockmaker of Wolverhampton. As first made, a nail gradually unscrewed itself in use, and finally threw

the whole lock out of order. This nail is now quite done away with. There can be no objection now made to rebounding locks beyond the general one, that, the more work you get out of a piece of mechanism, the greater the tear and wear, the rebound to half-cock being gained by the action of the mainspring on the hammer striking the plunger. Their safety is of necessity greater, as the hammer is never down, but unless voluntarily put on full- is always on half-cock, the safest possible position. Rebounding locks must, on the whole, be accepted as an improvement, and come into regular use.

Various plans have been proposed to connect the hammer and the plunger, and so insure the withdrawal of the latter, in half-cocking the lock. This is a matter of entire superfluity, and if the hammer and plunger be hinged to each other, so that the latter be impelled forward by a shove, and not by sharp impact, it will take immensely powerful mainsprings to prevent miss-fires. The difference of the force of a shove and a blow upon the percussion cap is very great, the latter being much more effective. The plungers are readily kept in their proper position by means of small spiral springs, very unlikely to break or get out of order. Again, if these springs be objected to, the extractor can readily be so made as to extend over the orifices in the breech through which the plungers pass, and so throw back the latter invariably on opening the gun to load. It cannot be too frequently inculcated, that every possible exertion should be made to simplify the mechanism of all guns whatsoever; and, as I think I have elsewhere observed, all complica-

tions, however ingenious and however highly trumpeted, have but an ephemeral existence.

Tastes differ greatly upon the mode of placing the plungers obliquely or horizontally. Some prefer the latter from the gun looking more trim, and from the blow being direct upon the percussion cap. The gun is doubtless neater, but it is a mistake to suppose, that a direct is more certain to give ignition than an oblique blow. It may be incidentally remarked here, that many terms applying to guns convey false meanings of superiority, and are industriously used for that purpose. "Direct" and "oblique" are cases in point; the word "direct" conveying a false sense of superiority. The oblique, as shown in the preceding diagram, is the more certain. This may be illustrated by the mode of igniting a lucifer match or fusee; you do not merely strike the match against a rough substance, you also scrape it. An oblique striker scrapes as well as strikes the percussion-cap, and thus not only gives more friction, but also acts upon a greater surface of the cap, a not unimportant point, for sometimes the fulminate does not lie exactly in the centre of the cap, and the oblique blow is more likely to act effectively upon it in such a case. Breech-loaders made with oblique strikers are much like muzzle-loaders in outward appearance, for which reason alone many sportsmen prefer them. On the other hand, the "direct fires" give less opportunity for dirt to lodge about the breech, and when guns are desired of exceptional lightness some advantage is gained. The whole question is a minor one, and I only dilate even thus far upon it through

having often had to give my opinion in writing to sportsmen at a distance, and hence know the interest taken in it to be greater than one might readily suppose. Sportsmen not unfrequently take deeper interest in, and espouse more warmly, the *pro et con* of such matters than do gunsmiths, who, accustomed to please the various tastes, come to regard them with comparative indifference. Indeed, opinionativeness on minor matters is very prejudicial to a gunmaker, who should work cheerfully to his customer's wishes, only pointing out to the latter things of essential consequence, advisable or not advisable as affecting efficiency, and, above all, safety.

Several varieties of breech-loading guns are made without hammers, the whole igniting mechanism being out of sight, and the opening and shutting of the barrels or breeches also cocking the locks. It is claimed for these that there are no hammers to interrupt your view of the game. Writing dispassionately, I should rather say that the presence of the hammers aid the taking aim, by so far guiding the line of sight into the exact middle of the breech. Every one knows that it is more difficult to shoot from a single-barrelled gun than from a double, from this very reason. With every wish to encourage genuine improvements, I can see nothing to recommend here as improving the aim; and I have again and again referred to the disasters attending complicated mechanism. The introduction of hammerless military rifles has probably stimulated similar invention on sporting guns, but it need hardly be pointed out that there is a vast difference between single and double-barrelled guns in relation

to this question. At the great Vienna Exhibition of 1873, the able jurors summarily dismissed hammerless guns on the alleged score of want of safety. Time, which tries all things, must try this also, but the absence of the hammer in military rifles is a great objection with all the officers whom I have consulted on this matter. Readers must not fancy that gunmakers have occasion to condemn any one system. As a rule, all systems are open to them; and, indeed, in most cases are pressed upon them by the inventors. The adage of "sour grapes," therefore, does not apply. Any bitter opposition must arise from other causes, almost invariably personal ones, and while unfortunately much more than the usual amount of professional jealousy exists, a truly good invention is sure to make its way in time against all opposition. I therefore write as I do of hammerless guns, with full appreciation of the utter uselessness of ungrounded condemnation, and found my remarks upon experience and facts. Besides, most sportsmen will agree with me, that, like the sound of the ratchet-reel in angling, there is something not only poetical in the click of the lock as you cock it, but that, with game before you or with your dogs on the point, the attention to your hammers has a beneficial effect on the nerves. It is a mechanical act to be attended to and performed, thus partly relieving the nervous tension which affects all but the most cool, I may say callous, sportsmen, on going up to their game.

Some sixteen or seventeen years ago a hammerless gun was brought out by a most ingenious London gunsmith, but certainly did not succeed, although in good hands.

About ten years ago another was invented by a person who offered me the patent rights for a small sum, but I declined the purchase. This was the best gun of the kind I have ever seen: it has never been brought into use. Since then several operative London gunsmiths unsuccessfully laboured in co-operation—for a very considerable period and at a heavy loss—on a similar invention. Since this, again, another was brought out in the Provinces, with very considerable publicity given it through copious advertising at the time, but of late I have heard nothing of its progress. I mention these facts, because the attempts to introduce hammerless guns for sporting purposes, however laudable in themselves, appear to me to illustrate the general proposition, that great ingenuity may be wasted upon inventions which are merely different from other guns in minor details, and introduce no improvement in the final purposes. It seems to me that the inventors confound mere mechanical ingenuity with improvement in the art of gunnery, which is really the desired object.

Other varieties have been made with the hammers outside as usual, but with the plungers and striking mechanism all within and out of sight. These have failed, greatly through causing miss-fires. In fact, as I have said, the inventive genius of the age has greatly wasted itself on mere variations from the normal forms, without improvement in principle, and to which the question, *Cui bono?* may almost invariably be applied. In doing away with hammers, for instance, the great value of the swing of the hammer itself in securing ignition is entirely forgotten;

and the same remark applies to those guns having indeed hammers outside to cock the locks by, but with the blow on the cap being insufficiently given by a cramped direct motion within. Much of this restlessness and desire to produce something new, probably arises from inventions finding immediate publicity in the columns of sporting journals, the editors of which feel themselves constrained by justice and generosity to give each invention a fair and equal chance. Thus exactly the same amount of publicity is given to good and useless inventions, which time alone must try. It may be answered to this that these editors should decide and report solely on the merits, but this is the very course their impartiality prevents. Honest condemnation would be assailed as ignorance or prejudice, and a charitable feeling gives each invention the chance of success. I write with personal experience as such a newspaper editor, and as one knowing the difficulties surrounding him. I desire my strictures to be taken only at their worth, but I cannot help pointing out, in justice to the reader, that after varieties of guns have been introduced with a flourish of trumpets, and for a very few years advertised as the *ne plus ultra* of breech-loaders, there is sure to follow something "more exquisite still," and this goes on, *da capo*. Where, then, has been the previous excellence? I may be blamed for thus freely expressing myself, but a public writer has a higher duty to fulfil than merely to give praise, and thus make things pleasant all round, while many of my readers must of necessity know, by their own knowledge and experience, how much these remarks are justified. I

assail no man's abilities. What I do assail is a harmful desire for useless changes from recognized forms, almost invariably to the injury of the inventor. I advise all would-be inventors to make as little departure from existing forms as possible. For instance, would the rebounding lock have succeeded had it involved a new shape of lock? The whole history of gun-inventions teems with cases of disaster through non-observance of such rules, long before modern breech-loaders were heard of. Of course these remarks do not apply to such important changes affecting the fate of nations themselves, as from the slow-match to the wheel, the wheel to the flint, the flint to the percussion-cap, the muzzle to the breech-loader. One painful case in point was that of a highly respectable London gunsmith, who was utterly ruined by expending his whole substance in merely altering the system of percussion-caps, and adapting his guns to that form. It will appear hardly credible that this man's great ambition was to place the fulminate on the outside of the percussion-cap. He put it so, the cap standing with its mouth upward, and the solid nose of the hammer entering it! On this utterly useless turning of the regular form upside down he expended his whole means in experimentation, and in adapting new forms of breeches and hammers. At last he succeeded in producing a gun to his mind, with the sad result mentioned.

In such a case one may truly ask, *Cui bono?* The existing caps did their work perfectly; yet an ingenious man shattered his business and prospects for life by the passion for bringing out a distinction without a difference.

There is too much of this passion at work now, to the bewilderment of sportsmen; and out of probably thousands of patented inventions in fire-arms, how fractional a number have been heard of favourably, or are being wrought at all? Who can estimate the shattered health and spirits involved, the sickness of heart through hope deferred, the ultimate ruin in many cases? Much of all this might be checked by a firm and judicious sporting Press; but the difficulties in the way would be almost insurmountable, and even the few strictures I venture now to make may be quite misunderstood and bring down heaps of obloquy upon my head. I write thus not to repress useful invention, but to direct it into really useful channels. Much benefit might also arise from "practical" gunsmiths becoming also practical sportsmen. They would thus learn many things of great service to them. I can never forget taking a practical gunmaker in extensive business, a man of middle age, who had mentioned to me that he had never seen a head of game killed, into my shrubbery near Glasgow, that he might try to shoot a hare I knew to be on the ground. I never saw a boy more excited or keener to get a shot. But when poor "puss" got up right before him, and went off at full swing, he stood transfixed with astonishment and utterly motionless, not the less so when I rolled her over. "Well!" he exclaimed, "I had no idea shooting was like this. Is this the way people shoot? Guns ought to be good. Why, it was all over like a flash of lightning!" This unvarnished anecdote may be usefully suggestive.

THE FOWLING-PIECE

HAVING now been described in its most important parts, it only remains to be said that in the choice of a gun the young shooter must be guided by such directions as have been already given, and by his own strength and ability to carry weight. It is not advisable that he should use a gun in the slightest degree too heavy for his strength; rather let him err on the other side, even at the presumed loss of range. He will enjoy his sport the more that he has only to handle a light tool, within his capability, and not overpowering him as the day advances. If he is a slow shot, requiring to dwell steadily on his aim before drawing the trigger, the barrels should be at least 30 inches in length. For a quick shot, who throws up his gun and fires at once, a shorter gun may be found the most effective; and the 12 × 28, already mentioned, will suit him admirably. As to the quality of gun, where the sportsman shoots very often, the best and highest-priced article will be found by far the cheapest in the end. In this respect a gun may be likened to a locomotive engine, which, as is well known, has a certain amount of "life" in it, the duration of which can be pretty well calculated beforehand, according to the efficiency of the workmanship—that is to say, the locomotive will run a certain number of miles, and no more. In like manner, a gun will efficiently shoot a certain number of shots, and no more. When we consider the extraordinary strain and vibration through all its parts to

which a gun is subjected at every discharge, and that it is a combination of some sixty to seventy pieces of iron and wood, we shall see the necessity of sound workmanship and good material, where frequent use is anticipated. For an occasional day in the season, a plain gun may serve efficiently for many years. As guns get used, the separate parts become looser, and the whole gun consequently loses its compactness, and the metal in the barrel its elasticity and tenacity; in a word, the gun gets used up, and this sooner or later, according to its original intrinsic quality. It has been already mentioned that a rather straight stock should be chosen, even although it does not at first appear to mount quite exactly to the eye. In the field, the advantages of a straight stock will soon become apparent, and the apparent difficulty to aim with it will disappear after a short experience. The gun should have no fantastic devices carved on it, but should be a quiet-looking piece of mechanism, possessing "that within which passeth show."

It is right at times to test the shooting of a gun before purchase, although with all real gunmakers of reputation, and not mere gunsellers, it may safely be left to their own care. All tests, except at game in the field, are, however, more or less fallacious, from the want of being able to bring into computation the degrees of resistance, to the comparative penetration, in the objects fired at. A very frequent test is that of firing at a powder canister with a common-sized gun, in the hope of driving an average sporting charge of No. 6 through both its sides at 40 yards. When a gunsmith or

other tells you his guns do this, ask him the *weight of his canister*, and then go and weigh any average canister in your own possession. It has been even whispered, that powder has been ordered in light canisters for the purpose of these being shot at.[5] Government officials, when testing a small arm, fire a pure steel ball, whose dynamic qualities are known, *and always at a number of wooden planks not touching each other.*

A very common test is to fire at a pad of forty sheets of brown paper firmly stitched together. Paper, but not of any arbitrary number of sheets, would form a fair test under most strict conditions, but not otherwise. It is an axiom in gunnery, that the penetration of a soft projectile, such as a leaden pellet, fired at a mass beyond its ability to pass through, is not a scientific measure of velocity.[6] The question therefore arises, why were forty

[5] It may, perhaps, appear invidious, but I shall couple no name with the following incident, which came under my own observation:—I was shooting at public targets one morning, when a gunmaker, similarly engaged, complaining of a headache, asked my assistant to fire a few shots for him. No gun could have performed better, as to pattern; but, for velocity, this gunsmith produced a powder-canister, stating that it was a condition of his customer's order that the gun should penetrate it. By sheer accident, one of the cartridges to be used had a loose wadding, which had to be replaced, but in doing so we found that whereas No. 6 shot had been properly used for pattern, No. 4 was being used to pierce the canister, which of course it did; but not a word of this change of size would ever be mentioned to the buyer of the gun.

[6] There are several other axioms, all bearing upon this question, but too long to go into in full. They may be summarized, however, as follows:—When a projectile has reached the target at which it has been fired, its effects will vary with its hardness, its mass, and its striking velocity. The hardness of a projectile always favours its

sheets, notoriously impenetrable, as guns were bored, ever selected, instead of firing at, let us say thirty or any other number, and going on to add sheet after sheet until penetration ceased through the whole number? The proportions of the whole striking the pad, and of those passing through the last sheet, would also have afforded a superior test if paper pads were used at all. The whole matter, which is little understood, and has created great bitterness in controversy, is a question of time and balance of dynamic power. The penetration into an imperforable mass will be deepest, not with the highest absolute velocity, but with the highest velocity that still does not flatten the shot. If the velocity be so great as to instantaneously drive up closely on each other those sheets of paper which it is not expected they can pass through, or there be the slightest support at the back of the pad, the pellets will *not* penetrate deeply in proportion to velocity, but be flattened and make much wider orifices in the paper through which they do pass. The accumulated resistance behind is so quick that the pellets have not time to perforate, and under this sudden check a very considerable amount of the energy of their motion is most undoubtedly converted into heat. For instance,

penetration into a body: it should increase with that of the obstacle. If not sufficient in this respect, it is flattened on contact, and presents a greater surface perpendicular to the direction of motion: it consequently experiences a greater resistance, and penetrates a less depth. The velocities and degrees of hardness of projectiles should be proportionate to the object they have to accomplish. Diameter and specific gravity may have much more useful effects than velocity and hardness.

a round rifle-bullet, driven at the speed given now-a-days (such as that recently recorded in *The Times*, when one of my Lockfast 12-bore rifles hit a large tigress in the chest and sent the bullet clean through the animal and out at the rear), on striking an iron target is literally melted into minute drops. Again, if the forty sheets should in any instance have looser contact with each other, the penetration will be much deeper than if they had been more compact. As it is impossible to equalize this compactness, the penetration is greatly a matter of chance; and this is proved by the fact that the same barrel will at one shot penetrate some twenty-four or twenty-five sheets, and at the next shot penetrate ten or twelve more. I am aware the flattening of the small shot fired at paper pads has been attributed to the pellets jostling each other in the barrel. Any examination of these pellets when fired from a first-class gun will at once disprove this. They will be found sticking in the paper, flattened on their anterior face, and retaining their rotundity in the rear. It has also been proved by careful experiment, that conical leaden bullets, fired at clay, penetrate deeper as the velocity is decreased down to a certain point. Thus, at 40 yards such a bullet penetrated one! at 100 yards two!! and at 200 yards $3\frac{1}{2}$ feet!!! Again, to penetrate water, shot must be driven at a low velocity. All this arises from the reaction of the thing struck. When the bullet passed through the tigress ($8\frac{1}{2}$ feet) it must have met no solid substance to react on it, so it tore its way along, the mere friction being insufficient to arrest its immense

speed. When the conical ball struck the clay at 40 yards, it called forth the reaction of the latter so rapidly, as to flatten the front of the bullet and stop its progress. At 100 yards the period of reaction was slower, more time was given, the bullet was less flattened, and the penetration was deeper. At 200 yards still more time was given, the bullet did not suffer, retained its shape, and penetrated deeper still. Beyond that distance the penetration would gradually decrease. All this ought to show the anonymous correspondents who in sporting prints have indulged in severe language against the present writer on this question, that they should have investigated the matter before bitterly assailing one who had no other object in view than the dissemination of truth. Not only had I tested the matter for myself, but I had the honour of submitting it to the highest authority on physics now living; who for reply not only informed me that I was correct in asserting that the penetration of leaden projectiles into such substances as they cannot instantaneously perforate, or which can therefore exert reactionary force, is not a proper measure of velocity, but asked me "if any sane man argued to the contrary?" I did not wish to drag this *savant's* name into the discussion, else its authority would have silenced all fair antagonists. My arguments have been ingeniously tortured into the having asserted that weak-shooting guns penetrate deeper, and will therefore kill game better, than hard shooters. My arguments merely affected the efficiency of tests, and had nothing to do with the question of absolute velocity. Can it be supposed for one moment that I, of all men,

should advocate weak-shooting guns? The complete answer to my opponents is, that, as by the laws of matter in motion, action and reaction are always equal to each other, so, as the forty sheets were not considered to be, and (as guns were) practically were not, all penetrable, so the reaction of the sheets not perforated was greater and quicker than would be opposed to shot travelling at a lower velocity. I never for a moment asserted that higher velocities have not more power. Any tyro knows they have. But my antagonists forgot that higher velocity gives more power to the paper pads also, when the shot is, by reaction, flattened and arrested in its progress. If we suppose an enormous velocity, until it little matters whether the shot be flattened or not, my arguments may fall; but that is not the question. Lightning —a most subtle fluid—travelling at inconceivable velocity, has been known to penetrate the solid earth to a depth of forty feet!

If the forty-sheet pad test be used then, it should be carefully suspended, so that by no possibility the rear can touch any support behind, such as a target, when the shot strikes it. (I have proved that hanging even a small bit of metal behind, under 2 oz., diminished penetration very considerably!) Even then it may not, from various causes, afford a proper test as between different guns. Here, again, is one of the paradoxes already referred to. It may do so if the velocity of all the guns give a fair probability of some of the pellets passing through, or nearly through, all the forty sheets, because, in these cases, the reaction of the few final sheets is trifling and

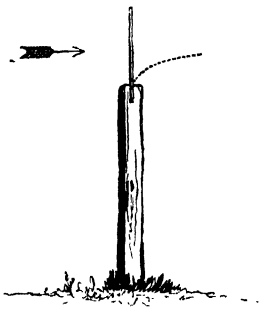
ineffective. This was formerly impracticable, and was not even expected at 40 yards with average sporting guns, 12 × 7lb. or thereby, and No. 6 shot; and was only first publicly done in February, 1875, by my eldest son, at Wimbledon, in presence of *The Field* editor: the editorial record may be found in that newspaper under date of the 20th of that month.

This was the result of what is called "the new boring," by which greater velocity than formerly known is gained without sacrifice of closeness. The proportions are now all altered by this extraordinary new velocity, but the general argument remains unaffected, only it would perhaps require sixty sheets instead of forty to give the reaction and meet the new conditions. In all comparative tests shot of the same hardness must be used in all the guns.[7]

[7] This so-called new boring is very old in principle, but has, with greater carrying out of that principle, been revived in the United States, and is commonly called "the American choke." It was originally effected there on single-barrelled guns, by screwing on a factitious muzzle of less calibre than the barrel itself. In this form it seems to have answered pretty well, but in double-barrelled guns, in which the result must be attained by boring, the effect was short-lived, and I have frequent communications from the United States, warning me against its adoption. These warnings I am very thankful for, but I had, so far back as 1872, found it all out for myself, after trouble and expenditure. For some time I discarded the system altogether, but, under advice, I resumed experimenting, and hit upon a mode of boring at once durable and increasing the range and pattern of guns in a remarkable degree. The difficulty formerly was to reconcile closeness and velocity, which were antagonistic; but as in other things, so in guns, there is a tendency to run everything to an absurd length; so in this new boring—which I certainly introduced on the broad scale, and

The true paper test would be to place the forty or sixty sheets in a rack, say at a quarter of an inch from each other, the gun perforating the greatest number being the best. This is a scientific test because there is no reaction, which is the difficulty to be overcome.

Another good test is at a sheet of tin, stuck an inch deep in a slit made with a saw across the head of a paling.



When the tin, standing perpendicularly, is hit, it yields instantaneously, bending to a horizontal position, and then recovering itself. In this rapid motion lies the ex-

properly modified, into Great Britain, beginning, as I have said, experimentally on the American "choke" system—a number of gunmakers seem to fancy that closeness is everything—a great fallacy. Proper spread and distribution are main qualities in a good gun, and, above all, there is durability, which daily experience in America proves to be incompatible with boring for undue closeness. It is not that the quality of close-shooting is gradually lost, but that the barrels themselves give way. The peculiar system I hit upon is perfectly free from this objection.

cellence of the test, for it takes a first-rate gun to perforate stout tin at 40 or 45 yards with No. 6 shot, seeing that the tin does not stand up to the blow, but by yielding deprives it of great part of its force, exactly as a cricketer draws back his hand at a "catch" of a swift ball, and so saves his fingers from being broken. The comparative merits of different guns can be found on this test by increasing the distance. Reflection for a moment will show that in this case there is little or no reaction. To write explanatorily, if not scientifically, it is a question of perforation, not penetration into a resisting mass, which repels the more the harder it is struck, and thus flattens and arrests leaden shot. Game are not so repellent.

Gunmakers judge velocity very correctly by the ear, carefully observing the sound of the shot upon the target, that it be all as of one projectile without any pattering. They also carefully observe the size of the marks on the target. The broader these are the better the gun.

In my own case, that is to say, for my own satisfaction, while not rejecting other systems when they are requested, I use the following test. I stand as near to the target as safety warrants, being 15 yards, and in such a position that I am 35 yards from the man firing the gun, or rather from the gun's muzzle. When the gun is fired, I am not satisfied unless I hear the shot strike the target quite as soon as, if not indeed sooner than, I hear the report of the gun. Although the time is only the nineteenth of a second, and the test cannot therefore be exact, yet it is an exceedingly

has gone at double the rate of sound, or, 40 yards, while the latter has gone 20. This is worthy of record and study by young sportsmen especially, to give them some knowledge of the powers of their weapon, for many a fair shot is not taken through want of confidence. The velocity is really such, that at 40 yards, time and space are annihilated. To compare different guns, the distance over 40 yards may be gradually increased.

In trying a new gun in the open, for bend and general qualities, the young sportsman should practise at *two* empty canisters, thrown by an attendant from one hand into the air. These will generally take somewhat divergent courses; and the aspirant should not cease to practise until he can regularly hit both, right and left, at nearly every shot. This will give him coolness and precision. The feat seems impossible to a beginner, or one who has not seen it done; but in reality it is only what is done regularly at game, and it is most excellent practice. I have already mentioned how poor a shot I was until I acquired the two-eye system; and I have known myself go on to hit two canisters, right and left, without a miss, until tired, and that with my man purposely throwing them in unexpected directions. I introduced this test for my own instruction in the art of building guns, as to mount, balance, and absence of rolling in the hand. To fire guns at targets alone gives none of the rapid action and necessarily instantaneous aiming which bring out a gun's real qualities. Practice therefore made me a proficient in rapidly fixing my eye upon and hitting the canisters moving simultaneously through

the air but often widely apart. To so hit one canister only is easy—to hit two, right and left, is quite another thing; and in learning to do so the young sportsman will acquire remarkable power over his gun at game.

Obvious reasons preclude me from discussing the prices of guns. It may be right, however, to remark that it is a great mistake to believe that, in buying from a first-class maker you are paying a fancy price for mere name. You are really not doing so. The money represents the actual value of the gun, the prime cost of which leaves, at the low prices of the present time, compared with those of fifty or sixty years ago, a very unremunerative return. I have been more than once consulted by younger men, on their laudably striving to go into the higher branches of the trade, on the very high prime cost of fine guns, immensely exceeding their calculations. They consulted me because they knew I would give them a true answer; and it may stagger those who fancy that prices are not governed by actual cost, to learn that, in going into every detail, the persons referred to and I brought out that cost to within ten shillings of each other. They had supposed that the finest class would bring the highest returns at existing prices; and finding their error, they sought for information from one of greater experience. At present, the highest class guns are steadily advancing in price; and this will go on until the money-value be balanced with that of other commodities. This is as certain as that water finds its level.

One reason why some sporstmen fancy that fine guns are inordinately dear, is the supposition that they are, or

can be, made in unlimited numbers. A high-class gun-maker can no more turn out an unlimited number of guns than an artist can of pictures. The moment he tries to increase his business by undue means, down goes the quality. For a year or two he flourishes, and makes large profits; but Nemesis is at his heels. His former reputation goes down with accelerating speed. I write from facts occurring from year to year, and am not drawing a fanciful picture. Guns are simple things to look at, but are far from being so in reality. Give ten men the same materials, and they will produce ten different guns in quality, style, mount, apparent weight (!), and shooting powers. I quote from a remarkably talented monograph on BREECHLOADERS, by "Gloan" (New York: George E. Woodward. Orange, Judd, and Co., 1873). "It is no economy to buy a low-priced gun, because it will soon become useless. . . . On the question of price, I have some very decided opinions. To my mind, there should be something higher to a sportsman in his gun than a mere tool, wherewith he works. . . . A fine gun is the work of an artist. . . . I advise the sportsman as to the purchase of his gun—'Let it be costly as thy purse can buy.'"

Sportsmen are apt also to fancy that gun-making is a free and easy "sporting" kind of affair. It is, on the contrary, one of the most exhausting and responsible of professions, many gunsmiths breaking down in health in middle life in consequence.

EXPRESS RIFLES.

It is not within the purpose of this treatise to enter at length upon the merely scientific question of the various laws which govern the ability to throw a rifle-bullet with precision. The numerous manuals which have appeared from time to time during the last twenty years will be found to contain all that the reader can wish for. Reading these is certainly dry work; and even I, "to the manner born," conversant with all the technical phrases, and with a full conception of the subject, seem always to rise from their perusal with something less of knowledge than when I sat down, so obscure and conflicting are many of the passages. I will therefore treat the subject popularly, and solely as affecting the sportsman.

All the art of gunnery may be said to rest on the axiom,—*That a bullet of any weight will fall from the muzzle of a cannon or other fire-arm, standing horizontally to the plane on which it so stands, in the same space of time that a bullet fired from the same gun, without elevation of the muzzle, will so fall to the same plane or level.* Now this is a very startling statement at first sight, and it seems absurd to say that a rifle-bullet can be projected many yards, yet without giving it elevation, in the same space of time that it would take to fall to the ground from the height of a man's shoulder. Yet so it is; and the whole art of the gunsmith, in the prolongation of point-blank range, is to utilize this short

period to the best advantage; for Nature, inexorable in her laws, will not grant him another thousandth of an instant. Whatever further time he demands for range beyond this period, he must pay for by some loss, carrying out once more the great principle I have endeavoured to inculcate, that in all gunnery we only arrive at compensation—a happy medium. In sporting rifles it will be found, however, that the laws of Nature are, not perhaps absolutely but practically, up to sporting ranges, nullified by the resources of art.

I assume that my reader understands that "point-blank" means the extreme point to which a gun will throw a bullet in a straight line. Yet even here, on this apparently easy part of the matter, authorities will be found to disagree. Scientifically, as adopted by British Artillerists, "point-blank" means the exact spot where a ball, fired without elevation, i. e. with the axis of the barrel set quite horizontally, will first "graze" the equally horizontal earth. The time occupied in reaching this spot is, as I have said, exactly the same as that during which the same ball would have fallen to the ground from the muzzle of the fire-arm.

But the Artillerists of other countries do not so consider or define "point-blank;" with them it is the extreme horizontal point reached by the bullet before it falls under the level of the line of sight. This appears to be a better definition than the British, yet it is open to the grave objection that it misleads by not admitting that there may have been a very considerable curve in the path of the projectile, as shown at C in the second

diagram. I desire to point out this all the more clearly, because these differences in definition afford room for much misrepresentation. There are very few makers of genuine Express rifles; and no sooner does any one of these reach and announce a true point-blank range of, say 150 or 200 yards, than rifles will be advertised called "Express," and claiming much longer "point-blank," the phrase being true in scientific nomenclature, but utterly false and deceptive in practice. True, the scientific point-blank—the second intersection of the line of sight —may be as advertised, but the all-important truth is concealed, that, at shorter distances, the bullet would pass over an animal's back, and at longer, strike the ground in front, or pass under its belly.

The true and honest point-blank is the extreme range attained without sensible curve in the trajectory; so that, up to that range, the sportsman has to make no calculation for distance, but fire off his gun under the same conditions at an object at any distance within that range. I do not assert it as certain, but my opinion is that the path of the bullet, in genuine Express rifles, is, up to 175 yards, a slightly ascending plane, rising perhaps one inch or thereabouts! To keep the matter clear in our minds, we should always consider the aim to be horizontal. Suppose a wafer stuck upon a wall, at the height of five feet from the ground, and you fire at it with the muzzle of your rifle, also at five feet from the ground (using no elevation of sights), the greatest distance obtained, before the bullets begin to strike under the level of the wafer, is the extreme point-blank range. The velocity of the pro-

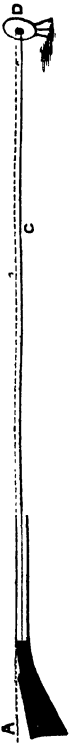
jectile, in its short flight, has been so great that the laws of gravitation have not had time to act. This latter definition I consider the best; it is more easily understood, and certainly is much more instructive. The first graze, depending upon contact with the earth, with which the path of the projectile is describing a very acute angle, can never be so well defined as the elevation at which the projectile strikes a target standing perpendicularly. To prolong this range, to get as much distance as possible during the same period, is to lengthen the point-blank.

The first of the following diagrams represents the British Artillerists' scientific point-blank. The second shows the foreign, and the third the sportsman's, or what may be termed, the common-sense point-blank,—meaning the going straight to the point, just as we use the phrase colloquially, as when we say that a man in any discussion spoke out "point-blank"—that is, without any disguise or circumlocution.

In all of these the dotted line A is the line of sight, the dark line is the path of the projectile, and D is the point-blank range. In the second, B is the first intersectional point, that is, where the bullet first crosses the line of sight; and D is the second intersectional point, and wrongly, in my opinion— as well as D in the first diagram —this is called the point-blank range. The third diagram shows the line of sight and the path of the bullet agreeing with each other exactly, for the sake of illustration; they are not absolutely or mathematically the same in fact, but so nearly so, as to be practically similar for


A
D
A


A
D
C
B
A


D
C
A

all sporting purposes, as no sensible curve can be detected up to 200 yards.

Everything, then, depending upon the space of time allowed by the laws of Nature for the flight of the ball, high velocity is the first object. The point-blank range, up to a recent period, was variously estimated from twenty to twenty-five yards, and was probably only the former. When twenty-five yards was attained, it is possible that the greater thickness of the gun-barrel at the breech, practically giving elevation, was not taken into account. Of course, I do not write of exactly mathematical theories. How, then, has the astounding practical point-blank range of even 200 yards been attained in the present day? I will illustrate this familiarly in answer.

I never cared much for rifle-shooting at targets; but in my youth I practised it to a moderate extent, being a fair, but not first-class shot. Spherical bullets were then solely used; and there was, as a matter of course, much diversity of opinion on the number of rifle grooves, and the rapidity of their spiral—their degree of twist in the length of the barrel. The common calibres ran from eighteen to twenty-eight balls to the pound. The charge of powder depended a good deal on the weather. One to one and a half drachms of *very finely-grained powder* was the general quantity. So slow was the flight of the bullet, even at the usual short range—100 yards—that gravitation and the resistance of the atmosphere played most important parts in the whole arrangement. So readily did the bullet rise or fall, that it was not uncommon to have the breech-sight so made as

to be raised or depressed by a screw, acted on by a common watch-key; and before beginning to shoot for accuracy a number of adjusting preliminary shots had to be fired, even although you had adjusted your rifle the very day previously! All this is quite usual enough now for long ranges, and would have been nothing extraordinary did we not bear in mind that it was to govern shooting at only 100 yards range. The slightest alteration in barometrical pressure—in the force or direction of the wind—upset all former adjustments. The trajectory—the curve described by the ball in its flight—was high, and so slow was that flight, that I have frequently, with many others, seen the ball speeding on its way. This of course could only happen to a spectator standing right behind the track of the bullet, and generally only in early morning or evening, when the rays of the sun were nearly horizontal. The rise in the trajectory varied; possibly with many rifles it amounted to twenty-four inches. Captain Forsyth gives eleven inches as the lowest curve he could obtain, at 100 yards, from a rifle manufactured by the most famous gunsmith of his time; and all this, mark, within twenty years past. This author, therefore, describes this rifle as "utterly useless and absurd for sporting purposes, that is, for *shooting game in the field.*" The italics are his, not mine; and I do not go his length in denouncing the rifle, the faults of which, let me explain, lay in the system, not with the able maker. But the quotation will illustrate the whole question. Sporting-rifles, then, had the same faults as those for target practice, with this aggravation;

that the general daily sighting could not be so adjusted, and that, unless at very short ranges, the distance from the animal fired at had to be calculated, and the moveable breech-sight set at the moment, frequently very inaccurately, distances being always deceiving.

The velocity, I have said, was low. If, to give greater speed, more powder were used, the ball "stripped;" that is, it refused to follow the winding of the spiral grooves, the edges of which therefore shaved off the lead, reducing the ball in size and sending it out without spinning on its axis at all, so that it travelled with no more accuracy than if it had been fired from a smooth-bore. To prevent this stripping, greased cloth "patches" were used to envelope the ball, thus curing one evil by another. Where, then, lay the chief error? It lay, primarily, in the grooving being too deep. Looking back now, it seems astounding that men, who must have known that the mere action of the forefinger and thumb could set a "tee-totum" spinning for quite a minute—or had in their boyhood ever whipped or spun a top—should have thought it necessary to pass a bullet along deep grooves to so severely operate on its periphery, and all this only to cause it to spin for a second or two! It was like crushing a fly with a wheel. This brings me to the second essential—some may call it the first—accuracy. I need dilate little on this part. Every sportsman knows that a rifle sends its bullets more correctly than does a smooth-bore, because it has spiral grooves cut along its interior surface, so as to cause the ball to rotate on its horizontal axis. This rotation not only compensates for

any inequalities in the density of the lead, but the centrifugal force, aided possibly by the friction of the air, steadies the bullet, and for a time prevents divergence. The same centrifugal force (the action of the air is doubtful; a top has spun two hours and sixteen minutes *in vacuo*) supports a boy's top during rotation on the point of its "shod." The rotation ceasing, the top "wobbles," and finally falls. A similar process takes place at the end of the extreme flight of a rifle bullet.

To increase speed, then, the grooves were made more shallow, and the spiral lessened in degree from a full turn in 36 to 48 inches to one in 11 or 12 feet. This gave accuracy at short ranges, sufficient for tiger-shooting and such like. In my own case, after the introduction of breech-loaders, I went so far backward as to adopt a spiral of 104 inches, with still shallower grooves, and on this system I have attained, with 12-bore spherical ball rifles, a common point-blank range of 90 to 100 yards, sometimes of 130 yards, and, in one gun only, 150 yards. For this rifle, which is now in the possession of a gentleman in Washington, D. C., America, the Unique gold medal was awarded me at Moscow in 1872. I mention this as believing that the award seems to be an acknowledgment that this 150 yards was the longest point-blank ever known to the jurors. Yet I gained the excessive range by a certain process, and not by lucky accident. In 16-gauge spherical breech-loaders 130 yards is readily attainable. We have therefore reached the point of extension of point-blank range to 100 yards, and even to 130, and, in one gun, 150, all with the old spherical

bullet, and this was done by shallowing the grooves, lengthening the spiral, and increasing the charge of powder to the limits permitted by safety and recoil, being from an average of $1\frac{1}{3}$ to a minimum of 4 drachms, with, also, the doing away with the cumbering and retarding greased patch. But all these, according to the laws of motion, could not extend the point-blank range to 200 yards; because, by the increased resistance of the air, increase of gunpowder will not give increase of velocity in equal ratio.

We now come to the introduction of conical bullets, one of those great yet apparently simple steps onward which, like the utilization of the elasticity of steam, so simple to us now, actually affects the destinies of nations. As we may look back astonished at deep grooving, so we may also at the exclusive retention of the spherical form of bullet.

I have said the "introduction," not the "invention" of conical bullets, for their use dates back for thousands of years. It is a fact ascertained beyond cavil, that the ancient slingers used, as I have already mentioned, notably at the battle of Marathon, leaden projectiles, shaped much the same as several forms of the modern conical bullets. The only essential difference apparently was that these μολυβδιδες were somewhat flattened, resembling the common flints found on the sea-shore. The dimensions were, approximately:—length $1\frac{1}{6}$ inches, breadth $\frac{7}{10}$ inch, and thickness $\frac{6}{10}$ of an inch; weight, a little over $1\frac{1}{2}$ ounces. It was doubtless of such a μολυβδις that Virgil writes in the following animated passage. Making due allowance for poetic licence, we may accept that these

missiles were thrown with great force, Virgil being, like all true poets, a very faithful describer:

> "The son of Arcens shone amid the rest,
> In glittering armour and a purple vest,
> (Fair was his face, his eyes inspiring love)
> Bred by his father in the Martian grove,
> Where the fat altars of Palicus flame,
> And sent in arms to purchase early fame.
> Him when he spy'd from far, the Tuscan king
> Laid by the lance, and took him to the sling.
>
> Thrice whirl'd the thong around his head and threw:
> The heated lead half melted as it flew:
> It pierced his hollow temples and his brain:
> The youth came tumbling down, and spurn'd the plain"
>
> ÆNEID, Book IX.

The description of the lead becoming heated by the rapidity of its motion is highly poetical.

Twenty-five years ago the world was startled by the rumour that a rifle had been invented in France, by an officer named Minié, throwing conical bullets to 1500 yards or more with precision. As a rule the British gunsmiths ridiculed the thing as an impossibility. For my own part, I resolved to fairly test its truth; and with all possible speed procured two of these rifles, and found their merits not exaggerated. This was the beginning of the movement yet going on, unless we honourably award the priority to the American "Kentucky" rifle. The great distinction in the Minié system was a means of swelling the ball transversely by pressure from behind upon a hollow in its base, and thus preventing loss of power by windage, that is, the escape of the gunpowder

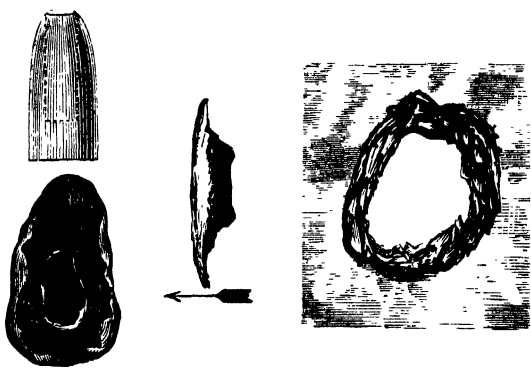
gases between the bullet and the barrel. This was done by inserting a saucer-shaped bit of iron, termed a "*culot*," in a hollow formed to receive it in the rear of the bullet. On firing the gun this *culot* was driven farther into the lead, sometimes indeed right through it, leaving the remains of the projectile in a tubular form in the breech of the gun. The *culot* was soon dispensed with as superfluous, and the calibre of the barrel reduced from time to time, until now the normal military rifle measures only nine-twentieths of an inch (·450). This, by the old mode of designating calibre by the number of balls, spherical, carried to the pound, is about gauge 50. By all this, greater range was obtained, so that, as my readers know, matches are now shot at all ranges up to 1200 yards and more. But it is not with these long-range rifles that sportsmen have so much to do as with that *chef-d'œuvre* of weapons, the "EXPRESS." Long-range rifles and Expresses must not for one moment be confounded with each other; and, practically, they form distinct branches of gun-making. Thus one maker may be celebrated for the one variety, and another for the other. They cannot well put out their strength upon both.

I have already stated that the increase of powder will not give proportionate velocity. The resistance of the atmosphere to the flight of the bullet is also increased. How, then, can the 200 point-blank range be gained? It is done in this way. In the first place, the charge of powder is enormously increased, in some calibres quite to eight times the old weight. Simply, without the retarding laws, this should prolong the point-blank eight

times, if we accept the old at 25 yards, and thus we should have the 200 yards without more ado. We do get the eight times, but thus—By narrowing the calibre out of all proportion to the charge of powder, or, conversely, by enormously increasing the charge of powder to the calibre; by shallowing the grooves and reducing their number; by using a conical ball, which, from its shape and length, maintains its velocity longer than does a spherical; and, finally, by reducing the weight of that conical ball, so as greatly to lighten it while yet maintaining its length. This is done by making it in the greater part tubular, and this tubular form doubtlessly assists the rotation, on the same principle that a hoop, which is all periphery without a centre, is so easily trundled. We have thus increased the charge, lengthened the bullet, and yet kept it light in weight, and, by the further help of the large charge of powder having its power still more increased by being burned in a comparatively narrow chamber, yet acting on a light projectile, the whole astonishing results are obtained. The ball, from its narrow shape, meets less resistance than a spherical from the atmosphere. Its length giving it what sailors call "way" on a ship, maintains its speed, so that if it start with less "initial," it possesses a greater "mean" velocity. But can this narrow and light bullet inflict a deadly wound on a large animal? Here is its terrible power, so terrible that these missiles are forbidden in honourable warfare. On striking they expand, sometimes flying to pieces within the animal, acting like a shell; sometimes whirling through after expansion (the

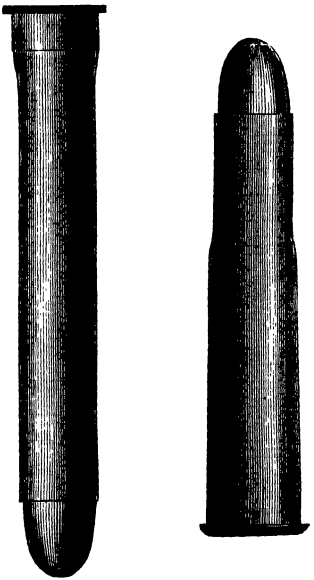
sharp edges cutting the blood-vessels during the onward gyrations), and passing clean through the less ponderous animals, as deer or antelope, leaving a hole some five inches in diameter; always killing instantly if striking the body. Solid conical bullets might not produce these terrific effects, but pass clean through deer, without causing immediate death: but solid balls, spherical for preference, are the most effective on large and thick-skinned beasts, as the elephant, rhinoceros, or hippopotamus. For tigers it is still an open question.

The following diagrams show—a ·450 bullet before being fired off, the tubular part marked by dots; rear and side views of similar bullets, after being discharged into a heap of loose sand; and also the exact dimensions of the orifice made in an iron plate, $\frac{1}{8}$-inch thick, by one of



these bullets at 100 yards. The orifice is as near as may be of the same size as that made by a spherical bullet of 12 to the lb. The latter weighs one ounce and one-third, the ·450 Express bullet only ten-sixteenths of an ounce!

It may give the reader a better conception of the extraordinarily large charge of powder used in these rifles, when their narrow calibre is considered, to show in the following diagrams the outward appearance of two of the loaded



cartridges. One is what is termed the "bottle-nosed," the other is the plain cylindrical. The bullet is inserted at the muzzle, behind that is a lubricating wadding; and the whole of the remainder of the cartridge is filled with No. 6 gunpowder, out of all common proportion to the weight of the projectile.

I have endeavoured to explain the principle of these rifles, so far as sportsmen are concerned, without entering upon mechanical details; and would only wish to add that, in their use, the details as to loading, &c., as sent out by the maker of the gun, must be strictly adhered to. That is to say, the rifle is the highest development yet known in the art of gun-making; that development is attained by exact conditions, and these conditions must be maintained as to quantity and size of gunpowder, keeping the tubular form of bullet, and all minor points. I once knew a remarkably correct rifle condemned, to the maker's great surprise. Inquiry proved that the purchaser said on receiving the gun, "What is the use of this stupid hollow in the bullet, and of such a quantity of coarse powder?" He cast his balls solid; he loaded with two drachms of No. 2 powder; and then he truly said that he had not an "EXPRESS RIFLE!"

THE DOG-CALL AND NIPPLE KEY,

IN these breech-loading days, when flasks and pouches are obsolete, are the only instruments necessary to the young sportsman's personal equipment—and the former

only, with the addition of a light whip, if he hunt his own dogs, which forms a great part of the sport in shooting. The best dog-calls are made of ivory, and are clear and shrill in sound. A small, well-toned, shrill call will be heard further than a larger, soft-sounding article. Some sportsmen always use a dog-call of a peculiar tone, to which their dogs get accustomed, and will alone obey. This plan is sometimes very useful. This may be termed a "dodge," or "wrinkle," of which there are as many in shooting as would fill a volume. A nipple key and turn-screw should always be carried—the former containing a pair of spare nipples, or spare plungers for breech-loaders.

THE DRESS

USED in shooting excursions should be of neutral colours, or a mixture of colours: shepherd's tartan is, perhaps, the best of all. The whole suit should be of wool, widely and freely made, with cap of the same material. In winter, dark colours will be found the warmest, by absorbing the sun's rays, and, from the converse reason, light colours should be worn in summer. Where game is very wild, it may be prudent to dress like the shepherds upon the ground. Have nothing glancing about the person. A light waterproof coat, carried in the game-bag, may save many a rheumatic twinge; and, while mentioning waterproof garments, it may be as well to add that a

similar cover for the gun will save much trouble after heavy showers. Beware, however, of tight waterproof clothing. One of the author's earliest friends had a suit of such stuff made for the moors, and on the first and only day he wore it he was taken ill on the ground, and, notwithstanding great exertions on the part of his attendants, who stripped and rubbed him, applying every restorative in their power, he died the same evening. The checking of the perspiration had literally poisoned him. Unless accustomed to their use, let no sportsman rashly trust his feet in newly-made laced boots. These are seldom made to fit properly. Custom and gradual use may enable the sportsman to wear them with impunity; but impeded circulation and stiffened ancles result from lacing them tightly: slacken the laces, and blistered heels follow. This apparently trifling matter has blasted many a young sportsman's high-wrought expectations on the "twelfth." Plain lacing shoes, with light hob-nails, and leathern gaiters, are by far the best things for partridge-shooting. They are light, do not impede free motion, and the gaiters protect the ancles. Laced boots are good for rough ground to those accustomed to their wear, and leathern leggings for covert and turnip or potato fields. Soft iron or copper nails prevent slipping on rocks; steel nails are highly objectionable. Castor oil is said to be excellent for softening boots without injuring the sewing. I have little faith in waterproofing mixtures; but it may be mentioned that all such preparations must have at least one antisicept ingredient, else the leather and sewing will become rotten. Of these probably common rosin is the best, and

there is no better compound than equal parts of tallow and bees'-wax, with the addition of about one-half the weight (one-fifth of the whole) of each in rosin. Common resinous ointment, to be had at any apothecary's, may be as effective as the most elaborate compounds. To apply the mixture, the boots must be first quite saturated with water, else the leather will not absorb it, and repeated coatings are then laid on before a gentle fire. It is bootless (without punning) to apply the mixture to dry boots.

AMMUNITION.

I HAD prepared at considerable length an historical account of gunpowder, with the chemical constituents of it, and of several new explosives, as well as their chemical products by combustion, but on consideration I feel that this treatise would be somewhat out of place in a sportsman's book. I would, however, draw attention to the remarkable importance of gunpowder in the history of civilization, in which it has played a part far higher than would at first sight be thought probable, and to the great interest its rivals are creating at the present time. Gunpowder has shared of late years in the general changes and advancement in all branches of gunnery, the breech-loading movement in particular greatly affecting it. It is somewhat surprising to find even yet sportsmen not

aware that they must use quite a different grain of gunpowder in the new guns from that used in muzzle-loaders. To reduce the pressure on the inner surface of the gun, and at the same time increase the velocity of the projectile, is the great problem to be solved. This is being done in small fire-arms and in great, the grains of the powder being proportional to the gun, until we reach the immense size of cubes of powder $1\frac{1}{2}$ inches in diameter, with a charge of 150 lb., a projectile of 800 lb., and a velocity of 1506 feet per second given to that great mass of iron! This, with a 38-ton cannon, is, up to March, 1875, the highest result ever yet attained.

Gunpowder is composed of nitre, charcoal, and sulphur, in proportion to the 100 lb. of $77\frac{1}{2}$ lb. nitre, $10\frac{1}{2}$ lb. sulphur, and 16 lb. charcoal = 104 lb., 4 lb. being allowed for loss in manufacture. These proportions vary, but the above may be taken as a fair average. Like the fowling-piece, gunpowder has been gradually improved for a long period, since the time when the alchemists, as was their wont, concealed the names of its ingredients under the veil of anagrams. It is certain that, for a long period gunpowder was known to learned men as a deflagrating substance, previously to its use for the propulsion of shot from fire-arms; and that the Chinese used it for fire-works 2000 years before the Christian era. Sporting gunpowder is much more carefully manufactured than the more common varieties for blasting and heavy ordnance. The charcoal in particular is most carefully prepared from well-washed and picked wood—the alder, black dogwood, and Dutch white willow being preferred. It does not fall

within the scope of this short treatise to enter more fully into the chemical qualities of gunpowder, yet the following remarks may not be uninteresting.

The effect of the combustion of gunpowder is the sudden conversion of a small solid body into a voluminous one of elastic gas. The nitre supplies the oxygen, which enables it to burn without the presence of the external atmosphere. The sulphur, burning at a very low temperature, increases the combustibility, and the charcoal supplies the carbonic oxide and acid, which form the largest proportion of the evolved gases, which, at the moment of firing, are estimated at about 2400 times the bulk of the powder. There is room, however, for much speculation on this point. Perhaps the safest calculation is to compare the bulk of the gunpowder with that of the gas, when the latter has cooled to the temperature and is expanded to the rarity of the air, when it will be found to be 240 times that of the powder. Suppose this pressure of 240 atmospheres to be only quadrupled by the heat of the explosion, and we have in round numbers 1000 elasticities, and taking the pressure of the atmosphere at the popularly-assumed weight of 15 lb. upon the square inch, we arrive at $15 \times 1000 = 15{,}000$ lb. pressure upon the square inch at the moment of firing. Even this may be considered by some as a ridiculously low estimate, and writing from memory, I think the last-made official experiments placed it at 94,000 lb. I should be inclined to question the correctness of such experiments. The results, viewed in connexion with the dimensions and weight of fire-arms, seem out of all proportion. This

immense pressure is probably still greater under such circumstances as prevent any possible escape of the gas, save by bursting, as mentioned in the next sentence. It is this extraordinary expansion which propels the ball or shot from fire-arms, and its power is enormous—28 grains of powder having been known to tear asunder a piece of iron calculated to be capable of resisting a strain of 400,000 lb. This, of course, was where there was no possible escape for the evolved gases save by sundering the iron. The sporting powder made by the best manufacturers is generally of so good a quality that it is enough to point out that for muzzle-loaders it should not be too fine in the grain, rendering it apt to get caked in loading; or too coarse, which is slower of combustion, and does not enter the nipple readily. The size called No. 2 will be found to combine the most advantages for muzzle-loaders and have least smoke. Breech-loaders are charged with coarser-grained powder. English gunpowder is famed all over the world for its superior qualities, and those readers who have travelled on the Continent may have been amused by reading the foreign rendering of the names of eminent English makers as printed on the canister labels of spurious powder. Should circumstances render it necessary for the young sportsman to exercise his own judgment in the choice of powder, the following test is the most efficacious. Place two small heaps of powder, say the quantity used in charging a gun in each, $3\frac{1}{2}$ inches asunder, on a sheet of clean writing paper. Fire one of them with a red-hot wire, when, if the powder be good, the flame will ascend with a good distinct report, the

smoke forming a white ring; no white specks will be left on, or holes burned in, the paper, and the other heap will probably not be kindled by any sparks. Should the powder not burn at once with a well-defined noise, and the other tests fail, the quality is not good. A simple and good test is to throw small pinches of powder into the fire, darting them quickly into the bright places. If the quality be good the powder will explode simultaneously and sharply, not desultorily and slowly. This is the most common test in use, and none is perhaps better for persons of experience. In damp weather, a highly-glazed powder is the best; but in good weather, a plain-coloured less sparkling powder is the strongest. Strength may exist without cleanness, and *vice versâ*. Of two evils, foulness is certainly the worst. Strength may be gained by adding to the charge, but nothing can compensate for stopped nipples, fouled barrels, and a rattling recoil. Some powder, with the ingredients undeniably good, is open to these objections, through being manufactured under too great atmospheric pressure during one of the processes. As it is only fair to give praise where it is due, I would say, without the slightest wish to undervalue the merits of other leading makers, as to the general quality of their productions, that the powder made by Messrs. Curtis's and Harvey appears to me to be the best for breech-loaders. Their No. 6 is admirable, and generally this firm seem to have most fully adapted their ingredients, or mode of manufacture (I know not which, for I only judge by practical results in use) to the requirements of the new fire-arms. When powder has become damp, it may be

readily and safely dried by heating a common plate and then spreading the powder upon it, turning the whole repeatedly, to dry it properly.

Gun-cotton has hitherto not been generally applied to fire-arms in this country. Although in America and Austria it was said to be successfully used in artillery practice, the late civil war in the former showed no proof of its actual use in that country. Incessant efforts are, however, being made to introduce this and similar new explosives, it cannot be said with perfect success, although powder is confessedly a coarse and not very scientific vehicle for the production of the great desideratum—a large volume of suddenly, yet not too quickly, evolved gases. Now that the attention of chemists has been directed to this fact, great results may be looked for. But, on the other hand, gunpowder has the invaluable quality of being controllable in its action, so that it can at pleasure be made to propel with little proportionate rending force, and also adapted to the weight of the projectile. Rending and propulsive qualities are widely different. The former may be compared to a jerk, the latter to an accumulative sweep of the arm. The barrel of a gun would be burst by a rending agent possessing little propulsive force, and as it is this force that we desire for fire-arms, any other is useless for the purposes of gunnery in any branch.

As I have introduced one explosive into this country, "Schultze's powder," the invention of Major Schultze, a Prussian artillery officer, possessing high abilities as a chemist, I would desire to write on these subjects with

great impartiality. I have too much respect for the old powder, and know its goodness and reliability too well to give any of its new rivals rash preference. Yet we live in an age of rapid progress and many changes, and explosives will probably share in the latter. Should the days of the old black powder be numbered, its manufacturers are not the men to lag behind, and can, out of the various new modes of producing other explosives, readily enter the arena of competition. Neither would I desire to praise Schultze's powder, with which my name is widely coupled, or disparage that of its competitors. I have not the slightest interest in the question beyond a desire to get the best possible explosives for the use of my customers, and the gunmaker would stultify himself, even beyond all Bœotian crassitude, who should recommend a bad or dangerous explosive for use in his own guns.

The specific difference between gunpowder and gun-cotton—the two extremes of mechanical mixtures and chemical combinations—lies in the fact that the ingredients of the former can be adjusted to a grain in weight, while the latter has the latent explosive power in uncertain proportions. Another great difference exists in the quality of ignition. If we kindle gunpowder by an infinitesimal spark, it is as effective as if by a red-hot poker. To develope the force of gun-cotton in all its forms, we must kindle it with a percussion cap, writing of course only of fire-arms. Even then much will depend on the strength of the fulminate, and still more on the mainspring of the gun-lock. Give out the same gun-cotton cartridges to two sportsmen, and one will give a good, and the other

a bad, account of them, and this discrepancy will in all probability arise from the one having a gun with better mainsprings than the other. Of gun-cotton, pure and simple, I have no hope whatever for use in fire-arms, and I should have much fear of its safety in manufacture. Modifications are being largely made, with what results time must determine. But the other day the public press recorded some experiments made at Faversham by the "Patent Cotton Gunpowder Company." The distinguishing feature from other gun-cotton of this compound, which it appears is only to be introduced at present for blasting purposes, is the minute combination of the gun-cotton with an alkali, under immense atmospheric pressure, and the reduction of the mixture to an impalpable powder. It is claimed for this explosive that its strength can be regulated by this atmospheric pressure. As it is not in use for fire-arms, I need say no more about it here. There is another explosive made by the "Patent Gunpowder Company;" but I am not aware that they have entered the market, although, as their shares are daily quoted in the share-lists, they would appear to be in operation. So far as I understand, their explosive is made on Muschamp's patent, from woody fibre. I am ignorant of the peculiar qualities of this powder when fired, and whether or not it is intended solely for blasting purposes. Dickson's gun-cloth had a short-lived reputation, which seemed to die out utterly when a charge of it shattered the late Lord Gage's heavy rifle into thirty pieces, with a report which his lordship wrote me was loud beyond all description. It may serve to

show how wide is the difference between propulsive and rending forces, that five previous shots, which Lord Gage had made before his rifle burst, sent the bullet a great many inches too low at fifty yards only! Reeve's "gun-felt" is one of the new explosives most widely advertised. In appearance it is darker than gun-cotton; I have not had much experience of it.

Schultze's powder occupies an intermediate position between gunpowder and the purely chemical combinations. Practically, Major Schultze claims for it that it is neither more nor less than common powder *minus* sulphur, which he deems superfluous, and that it is partly a chemical and partly a mechanical mixture. He cuts the wood best adapted for powder into grains; expels the albumen by means of acids; withdraws these acids, and then saturates the grains with a solution of saltpetre, proportioning the weights. He claims that while in gun-cotton the amount of nitre present is never, and cannot be, known, he can duly apportion his nitre (it being used in substance and not in an acidulous form) by weight. In appearance this powder resembles sawdust. So the whole question stands at present; in a tentative position. The old black powder has all the superiority in being constant in its powers. The new aspirants rejoice in less smoke. As to recoil, the latter are uncertain in its degree; as a rule they have little. The old powder is less absorbent of damp than Schultze's, and much less than gun-cotton. On the other hand, Major Schultze claims that his powder improves by keeping, and that any damp it does absorb very little affects its propulsive power. Impartial judg-

ment will pronounce that while the proportions and qualities of black powder are known, and can be governed systematically, much of the quality of all the new explosives will depend upon the success with which each separate quantity made at once has been treated. The same impartiality will, I believe, give the verdict in favour of "Schultze" as compared with any other explosive, except black powder, yet introduced. It has also this advantage over its modern rivals, that it is easily loaded in breech-cartridges, one half or a little over the weight of black powder being the charge. As it is light proportionally to bulk, this half-weight occupies, when rammed home, exactly the same space in the cartridge as the charge of black powder—a great advantage. Schultze's powder has another great advantage in its remarkable safety in manufacture, transport, and storage, and it shares, with black powder, perfect immunity from self-combustion.

Shot should be clean, bright, and spherical in shape, and the greater its specific density the better. It is common to hear sportsmen praise shot for being hard, but this is a great mistake. No comparative increase in hardness can compensate for the want of weight. Soft lead is heavier than hard; and the first consideration is a pure, sound metal, from its density possessing the greatest available momentum. It is an advantage for small shot to flatten on hitting game. This is a very different thing from the non-scientific paper-pad test. By flattening a little on the bird—or hare, for instance—it increases the area of the blow, and also carries in with it a small

mass of feathers or fur, thus practically enlarging the projectile. As it is an axiom that the area of the wound is the measure of destructive power to animal life, it plainly follows that this enlargement causes the game to drop instantaneously, whereas hardened shot will give a smaller area of wound, penetrate deeper, and perhaps pass through the animal altogether. But this penetration or perforation will, although finally fatal, not kill with the desired instantaneousness, unless the heart or some other vital part be struck. I find that the eminent authority, the late Captain Forsyth, writing of spherical rifle bullets (he had no experience in Express rifles, if indeed he ever saw one) entirely agrees with me on the superiority of soft lead. It in no way affects the question that he does not write of small shot—the principle is entirely identical. The penetration of the softest shot into game is more than ample, with all its other advantages, such as the more destructive shock given by greater momentum; there seems nothing, therefore, to be gained by hardening it, while doing so may operate severely on the gun-barrels. Soft shot, fired at paper-pads, penetrates rather less deeply than hardened, but makes larger orifices in the sheets it does penetrate; and this proves the argument to be entirely in its favour for use at game, which do not in the slightest possess the reactionary property of the sheets of paper.

Shot usually contains a minute quantity of arsenic, less than 1 per cent. This gives the lead the property of spherical granulation. This use of arsenic is, I believe, not now universal. It is beyond my province to discuss the

question of alloys, said to be used to harden shot, but it may be useful to note that whereas lead has a specific gravity of 11·4, antimony has only 6·7, and bismuth 9·8. If these be used, the specific gravity must be lowered. I do not know that they are used, but I have heard it so stated. Mercury, sp. gr. 13·56, is too expensive, if indeed it can be used at all. To harden leaden projectiles, mercury would require to be used in the expensive proportion of one-twelfth weight. The best size of shot for general purposes is No. 6; and the proper quantity for the various bores will be entered upon below. (See "How to Load.") It may be here laid down as a general rule, that small shot requires most powder; also, that the smaller the size the less must be the weight of charge, and the larger the size, the heavier must be the weight of charge.[8] Want of momentum must be compensated for by increased velocity; and paucity of pellets to a given weight must be compensated for by increase in number, by adding to the whole weight. The range may be from $\frac{3}{4}$ oz. to 2 oz.

Since the above was first published, I have frequently been asked to reduce the general remarks to a formula.

[8] Probably, in olden times, no shot was used smaller than Nos. 2 or 3, hence the old French adage, "Chiche de poudre et large de plomb"—Meagre with powder and lavish with lead. The Spaniards put it still more forcibly and grandiosely, after their manner: "Poca polvera perdigones hasta la boca"—Little of powder, but shot up to the very muzzle! Now-a-days all the tendencies run contrary to the old systems, and what the author terms his "Express shot guns" are remarkable for their performances with small charges of shot. A light charge of shot is a benefit to the sportsman from every point of view.

Taking fair average guns into consideration, and allowing modifications for individual cases, the following may be adopted as a safe guide:—

Size of Shot.	Powder.	Shot.
B.B.	2¼ drachms avor.	2 oz.
No. 1	2¼ „ „	1⅞ „
„ 2	2¼ „ „	1¾ „
„ 3	2¼ „ „	1¾ „
	2¾ „ „	1⅝ „
	3 „ „	1¼ „
	3¼ „ „	1 „

Of course the above applies to average guns, of 7 to 7½ lb.; and it may be noted that a good shot need not use more than 1 oz. No. 6 shot, but retaining the 3 drachms powder. When guns weigh over 8lb., the powder may be increased for the larger sizes of shot, but the shot will certainly be more scattered. Cartridges are by far the best for such work as heavy shot is used for. But, while the above formula is correct in itself, as used in the regular system of boring, it is incorrect for guns bored upon what is termed "the new system." In the latter, the proportions must, as a rule, be found out for each gun by experiment. Strange as it may appear, increase of powder and diminution of shot will, with the new boring, increase the closeness with which the latter is thrown.

Percussion caps have a great range in quality. The priming may be of silver or of lime, and there are also various metals used for the shell, but pure copper caps with silver lining should be used. The inferior caps fly to pieces, and cut the face and hands, and the eye-sight

even has been thus lost; while the common primings rapidly corrode the gun, and also, by absorbing moisture, become useless in damp weather. Waterproof caps are prepared by a covering of varnish: they require a very strong mainspring to make the ignition certain. They are excellent for the purpose desired, but damp will find its way to the powder in the nipple. This has been again very effectually obviated by a lining of gutta percha to the cap; and such caps should undoubtedly be solely used in our army and fleet, and where there is much exposure. Caps should not require much pressure to fit them on the nipple, as this splits them open at the joinings, and admits the damp.

Wadding, at one time considered a matter of little moment, now enters largely into the question of how to shoot well. The qualities desired are toughness and elasticity. When flint guns were in use, the combustion of the powder was produced without any pressure from without, but simply by the continuous train from the pan through the touch-hole; consequently there was no direct impulse upon the charge itself. The percussion system had a different effect. The flash of the cap was in itself pretty strong, and that flash and the gas, evolved by the burning of the powder within the nipple and cross-chamber, were both prevented egress backwards by the pressure of the striker upon the nipple. There was therefore considerable force directed upon the charge (and this still applies generally to breech-loaders); and it is of much consequence that this be not removed from the breech until combustion takes place. (Here is

another proof of the advantages of front ignition.) This desirable result is attained by the use of thick elastic woollen wadding, which, being not readily displaced when rammed home, resists the pressure sufficiently for the purpose desired. Completely filling up the calibre of the barrel, it may be said quite to obviate windage, and thereby much increase the projectile force. It also possesses the very excellent quality of not being blown to pieces in the barrel, and therefore it drives the pellets of shot regularly before it, keeping its position transversely in the barrel, as may be seen by the marks of the pellets upon a discharged wadding. It is of less consequence that the wadding above the shot be equally thick and elastic with the other, as far as the above reasons go; but a very thin wadding permits (in muzzle-loaders) the shot in the second barrel to be dislodged by the firing of the first, which is carefully to be avoided.

It may be useful to mention here that an over-tight wadding causes a gun to scatter the shot, and that it is particularly essential in all guns of wider calibre than sixteen that the wadding fit correctly. Under that calibre the comparative amount of difference in the width of bore is less as between the sizes, but in the wider guns nothing but the most exact fit will do. On this account, half-sizes of wadding have been introduced to suit such wide guns as have been necessarily worn or bored so as not to gauge to an exact size, but thick elastic wadding renders such half-sizes practically superfluous.

Good wadding is prepared with greased edges, and a comparatively recent, but very great improvement, is the

addition of mercury, which rapidly removes the lead deposited in the barrel on every shot being fired. To judge of good wadding, cut it through with a penknife, and see that it be perfectly solid and compact in its consistence. There is much occasion for this examination, for it is quite a usual practice for wadding to be sold as of the best quality which is far from being so. The great difference in the value of wadding (as well as in the prices of different qualities of gunpowder) gives occasion to considerable controversy on the prices of loaded breech cartridges. Some gun-makers are supposed to charge for these too highly, when the fact is that they are supplying better and less profitable qualities. From the high price of good materials there is a wide margin, as commercial men term it, for a profit, by substituting those of inferior quality; this not only injures the shooting of the gun, but is unjust to the fair trader, who, selling the really genuine article, which necessarily must cost more money, is therefore supposed to be making an overcharge. Very probably he would make a greater profit by selling the inferior. Jute, a vegetable fibre imported from India, is now largely substituted for wool, and is probably not much inferior to that material.

(For breech-loading-wadding see "Breech-loaders.")

The wire-cartridge is a modern improvement in ammunition. Its name has rather operated against it, as it is not in reality a cartridge (which, according to Walker, is a case of paper filled with gunpowder), but is simply a shot-case, and contains no powder. The heavier a projectile is, the greater is its momentum—that is to say,

the farther it will go when once started at a certain velocity. The wire-cartridge gives to each separate pellet of shot, as far as possible, the momentum of the whole charge. For this end, the charge of shot is placed, along with a certain quantity of bone-dust to fill up the interstices, in a little wire basket, with a wadding at one end, the whole being enclosed in a roll of paper. The effect is that the cartridge leaves the gun like a ball, and gradually, as it advances, throws off its shot, increasing the range of a common fowling-piece by at least a third. The first wire cartridges in fact had the fault of being only too long in their range; their proper action is now made more certain. Cartridges are specially useful in breech-loaders. Two varieties are now made—the Green, for very long distances, and the Universal, which has no wire-basket, but is simply a charge of shot, with bone-dust and wadding enrolled in paper, and is useful for quick loading, and for guns which scatter. This last certainly throws the pellets much more regularly than in a loose charge; this is presumed to arise from the presence of the bone-dust preventing their jostling.

Cartridges may therefore be assumed to increase the range of the fowling-piece, but it is the particular wish of the author of this little treatise to instruct the young sportsman by pointing out both the objections to, as well as the advantages of, the various subjects discussed. Were game to rise regularly at a given distance, or were only one variety of game to be fallen in with at a time, there would be no objection whatever to the use of the wire-cartridge. It is the uncertainty in these matters

that is the objection. If you load both barrels with cartridges, and then be obliged to fire at a short range, you either miss the object altogether, or blow it to pieces. Again, if you so charge one barrel only, you get puzzled in the excitement of the field, and very probably pull the wrong trigger. The young sportsman, when he does use this cartridge, must keep himself particularly cool, remembering that his range is increased, and also calculating, on taking that long range, on the effect of distance. The Universal cartridge has not a single ground of objection to it. Its use increases the range of every gun, by the regularity with which the shot is thrown, having no open spaces through which the game may escape. When a gun shoots weakly or irregularly, this cartridge is consequently invaluable. The barrel is also much less fouled than with loose shot. Altogether this is an excellent article, and it is somewhat surprising to see it so little used in breech-loaders, and for these new guns generally both the varieties can hardly have an objection, seeing how readily the charge can be removed and another substituted, when a different kind of game is likely to be found.

DOGS.

THE subject of dogs used in shooting opens up so wide a field, that a whole volume might not suffice to treat it

thoroughly. I shall, therefore, at present limit myself to some general remarks upon pointers and setters.

I would earnestly inculcate the young sportsman in the knowledge and belief that, in his dogs, he may possess an unending source of pleasure of high order. It is needless to go into raptures over the dog being the friend of man; of it being faithful to rich and poor alike. These are recognized truisms. But what I would wish to teach is that, in the observation and cultivation of the sagacity, abilities and performances, of the dog lies an endless gratification. Anecdotes of dogs are inexhaustible. I have had in my time several hundreds of these animals, of high and low and every degree, and can believe almost anything I read of their wisdom. Until of recent years philosophers laboured to define reason and instinct. They set these widely apart, and so fell into grave errors. Now-a-days, he will be a bold man who shall attempt to define where the one begins or the other ends. "Man," writes Lord Bulwer Lytton, in his sententious style, "who is the most conceited of all animals, says that he alone has the prerogative of thought, and condemns the other animals to the meaner mechanical operation which he calls instinct. But as instincts are unerring, and thoughts generally go wrong, man has not much to boast of, according to his own definition." It is the action of the dog, as well as of the horse, the elephant, and a few other animals, on this border-land of reason and instinct, that gives anecdotes of animals so great a zest. The mind of the reader is excited and pleased by learning that a dog, with only its inferior lights to guide it, per-

formed such and such an act, so like to being done on reasoning. Are its lights inferior? May they not be only confined to a more narrow scope? I will venture on giving one or two anecdotes, separately of no great importance in themselves, but for my present purpose bearing on this question.

One general characteristic of dogs is their attachment to and respect for the head of a family, although he pay the animal no special attention. Here we have an approach to reverential feeling. They seem also to have, in common I believe with horses, a fear of the vague and undefinable. But the other day, on taking a most staunch terrier into the studio of my friend Peter Macnab, she showed quite a terror of his lay-figure, retreating under a distant chair for safety. Now the figure wore no menacing expression; had no uplifted arm; but was simply dressed to represent one of those female figures, that Mr. Macnab puts so beautifully on idyllic canvas. Every one knows that these lay-figures possess a weird-like aspect, causing a nervous person to start at first sight, but we should hardly expect an inferior animal to share in such sensations.

When a boy I had a cross-bred terrier, which in two lessons learned to go and purchase a roll for himself, carrying a half-penny in his mouth. This is a common enough performance. When he was somewhat old in years I gave him to a lady, and although he was never known to have carried home any other article on any one occasion, he surprised her one day by rushing into the room and laying on her lap a small church Bible much

soiled with mud, which he had found on the street. Now this dog must have seen books read, therefore reasoned that they were of value, and seeing this one, lifted it and carried it home as an article to be appreciated.

I had another highly-prized terrier, of a gentle but most staunch character, which, whenever it saw my cockerels fighting, invariably went quietly between them, and put an end to the combat, and this, with all the benevolent air of a peacemaker, keeping his position until the birds went in different directions. The end of this amiable creature was sad. He was the exact colour— and had long upstanding ears, as exactly like to those— of a rabbit. In consequence of this I for a long time resisted the importunities of a friend who wished to buy "Toby" for use in rabbit-shooting. This sportsman expressed himself so indignantly confident of his own ability to distinguish a terrier from a rabbit in thick covert, that at last I reluctantly let him have the dog, which he shot dead for a rabbit on the very first day he had him out! *Per contra*, I had at the same time another dog, whose only regard for my poultry was to steal their eggs, which he emptied by taking them to the garden, and holding them down in the soft mould lengthwise between his paws, crushing the side of the shell and licking out the contents. When this dog was scolded, he literally laughed in one's face. He had not one redeeming virtue.

I had another terrier, which I presented to a relative, who caused each litter of puppies the poor thing produced to be drowned. After this occurring several

times, on the next occasion the distressed mother littered in a small inaccessible rocky cavern, and there safely reared her offspring. This, if not the result of pure reasoning, was a very nigh approach to it. The puppies grew up as wild as foxes.

I had a pointer bitch, the best at "roading" pheasants through covert I ever saw. "Bell" always took care never to go more than a few feet in advance, and never pressed the bird she was following in thick places, actually seeming, by frequently looking back to me, to study my ability to keep pace with her through the brushwood. No sooner, however, did we reach an open spot than her whole tactics were instantaneously changed, and she, of her own accord, made a sudden dash at and flushed the pheasant. Is it too much to believe that she did this, which could have been done as readily at any time during the previous pursuit, only when she knew that I could get an open view of the pheasant, and so make sure of my mark? This dog must have understood; firstly, that it was not her business to catch the pheasant; secondly, that it was my purpose to shoot at it when I had the opportunity; and thirdly, that I could not effectively shoot at it if she raised it either too far in front, or where I could not get an open space to fire in. Her whole conduct was exactly that of a fully reasoning being in the same circumstances. Somewhat apart from the question of reasoning is the yet interesting subject of the susceptibility of some dogs to music, and also to only particular notes. I had a very large rough Highland deer hound, the tallest dog I ever

saw, which, whenever my daughter was playing, laid his head on the music-book on the piano, and, always in that position, seemed to listen in great enjoyment. I know now of a lap-dog which, whenever a certain note on the pianoforte is struck, rushes under a chair and howls dismally. No one other note in the whole range produces any effect on it whatever. This susceptibility to one note is not uncommon. Another notable quality or characteristic of dogs is their sense of property, and their ability to form a pretty correct estimate of character. I had a dog so gentle and kind to the domestic cat, that the latter often used his coiled-up frame before the fire for a cushion to slumber on. Yet the same dog inveterately—and even viciously—pursued every strange cat he encountered. I recently had a Scotch terrier, which made a point of not only growling at any "tramp" who paid my cottage a visit, but invariably saw him safe off the premises, accompanying him for at least a hundred yards along the highway, and then returning with a solemn air of satisfied responsibility. No respectable person was so treated. Comment on this is needless, even impossible, except in an unsatisfactory manner. It is as deep as metaphysics, which the Scotch blacksmith defined as what one man, who did not understand a bit of the subject himself, explained to another man who understood it still less. To conclude these remarks, those who will study the character of dogs will find as great diversity morally, if I may use the expression, as among men. I have had the mean, the sneaking, the heroic, and the benevolent. I have had

dogs capable of any meanness, but never of a gallant action; and I have had others who were incapable of any meanness, but not of committing a crime.

The various articles more immediately connected with the use of the fowling-piece having been now described, the next step in the equipment of the young sportsman may be supposed to relate to the canine genus. Two varieties of dogs are in common use in the pursuit of game in shooting—passing over for the moment the nondescript retriever, which will be shortly referred to when I write of Pheasant-shooting—the pointer and the setter, each of these having his good and bad qualifications. The first question is, what is the nature of the ground over which the dogs are to be hunted; and the next, the probable amount of work they are expected to do. The pointer is the more slow and sure dog; the setter the more swift and lasting; but he is decidedly a degree removed from the natural, steady, and full-developed pointer. All dogs make a pause before rushing on their prey—this may even be seen when two dogs are playing with each other—and this pause has been educated up to a certain steady stand-still, until the dog is permitted by his master to break it. The smooth-haired variety frequently raises one of his fore-legs while on this pause; this has procured him his name, as if he were "pointing" out the position of the game before him. The other variety, whose rougher coat and general appearance give him a resemblance to the spaniel, from which he is probably descended, usually crouches in his pause, and has therefore been termed the "setter." The qualities to be desired,

and the faults to be guarded against, are the same in both; but, as already mentioned, there are inherent qualities in each variety which render them different in nature and capabilities. It may at once, however, be decided that for the beginner the pointer is the preferable animal. Their several and also general merits may, however, shortly be discussed.

The pointer is supposed to be derived from the wild dogs of Andalusia, which a Spanish monk observed to possess the habit of making a full stand before rushing upon game. Seeing the great use which this habit might be turned to, the monk carefully trained a dog and his progeny, from which is descended the whole modern race of pointers. The story may not be true, but is exceedingly probable; and the Spanish pointer is still in request, although not so good as our own.

Other animals of the canine race, however, make this pause as well as the dog. The grey fox of America makes a dead set upon his game for a considerable time before delivering the fatal leap. It must be kept in mind, also that a high-bred dog is positively cataleptic when standing over his game, and it is hardly probable that in a wild state this can be the case, as it would frustrate the certainty of seizing the prey. It is perhaps idle to hark back upon the past history of the pointer and setter; their future capabilities are of more consequence than their preterite origin.

The Spanish dog is a more sluggish animal than the English, and has the peculiarity of having a very large nose divided perpendicularly by a deep fissure. The well-

bred pointer should have a sleek coat of hair—fine soft ears—a high poll—open nostrils to permit the full development of the nerves of smell—a deep hollow under each eye—straight forelegs, and well-crooked hindlegs, so as to project well at the hocks—back well coupled at the loins—fine tapering tail set on level to the back—and small, round feet. A good pointer has an air of quiet sagacity and education, easily observed; while a froward, foolish animal has a careless, roving eye. Good dogs of any kind watch their master's eye, and appear anxious to please him. Much may also be judged by the shape of the ear, which should hang easily, and not be partly raised or cocked when the attention of the dog is drawn to an object. The chest or counter should be full and deep, for the free play of the lungs. There are other points varying in different stocks—such as deep flews; and some good breeds have not the fine tail usually desired as a proof of good blood; but an unusually long jaw and tail, and general swankiness, denote a trace of foxhound descent, giving a good nose, but a wild and unmanageable temper. Better to err upon the other side by choosing a short, compact, yet slower and more obedient animal. As to sex, there are circumstances which render the dog more generally to be preferred, and they are therefore the higher prized; but the slut is the staunchest animal. Fineness of smell, called "a good nose," is indispensable; but the young shooter may be surprised to learn that this essential may be too good for use. This over-organization is generally supposed to result from "breeding-in" too closely. When the sense of smell is over

acute, the judgment of the dog is baffled. He may doubt that there is game before him; but that sensibility of the nerves over which he has no control misleads him, and he points against his better judgment, as it were. That he has so erred against his judgment we may safely believe by the evident shame he feels at discovering his mistake. He makes "false points"—i. e., he points at where game has recently been and left its scent. We can form no conception of the power of the sense of smell as developed in the dog by our own. The following anecdote may give some idea of it:—I had a black pointer slut which, while shooting on a moor in Argyleshire, I had severely rated for eating some carrion, part of a dead and putrid sheep. Passing to leeward of the same carrion about an hour afterwards, "Bess" evidently remembered the former scolding, and, giving me an expressive look, continued to hunt. The stench from the carrion was so great as to be almost insupportable, and hurrying past it, I was surprised to observe the pointer, generally a most obedient animal, make a sudden wheel, and "draw" directly upon the carcase, from which no whistling or command could prevent her. An advance to check her led to only her steady and regular approach, making point after point, to the dead sheep. Annoyed at this, I seized her by the neck and drew her away, when at that moment a cock-grouse rose from the very mass of carrion, where it had possibly been feasting on maggots, and gaily crowing, flew down the hillside, but was in a few minutes afterwards safely bagged. After the bird had gone, the pointer at once cheerfully resumed her hunting. Now,

here was the sense of smell so powerfully discriminative as to detect the presence of one small bird, from which not very much scent could come, amid the horribly tainted air from the dead sheep. The same pointer would "road" a bird through apparently endless windings until she made it out, but was frequently led into errors, of which she was evidently ashamed, by the over acuteness of her sense of smell.

Setters are very different from each other in appearance according to the breed. The black-and-tan variety is the most beautiful. These should have long, soft, and silky ears. Some of the best English breeds have short ears, a fact which not unfrequently confounds the judgment of would-be connoisseurs. Mr. Laverack's breed, which I have known for twenty years, are in high esteem. "Gordon" setters are very famous. These are black-and-tans, of gentle temperament, yet hardy in the field. A common subject of discussion among sportsmen is, what are the marks of a Gordon setter? One man will tell you that they are pure black-and-tan, without white, and this opinion too commonly carries weight. Another will as strongly asseverate that no dog is a "Gordon" that wants the white. Writing with some knowledge of the subject, having had many of these dogs through my hands, I agree with the latter, and consider the white spot, usually on the chest, a mark of purity of breed. I have observed, however, an occasional puppy bred in a kennel of pure Gordon's having no white, neither being a pure black-and-tan, but of a rich mole colour. The handsomest dog I ever saw in my life was of this mole colour all over.

Setters are very valuable. No less than five hundred guineas has been paid, to my knowledge, for a male setter of high pedigree and reputation! The red Irish breed are sometimes magnificent animals, but are uncertain, requiring a great deal of work to keep them in order. It may be said of them, that they are either very good or very bad. All the varieties should have long feet, in contradistinction to those of the pointer. The hair on the tail, and on the rear of the legs, should be long and soft; this is called being well feathered. The "dog" should be a rather square-built, up-standing animal; the "slut" more rounded in form, with smaller and more tapering head and nose.

The setter is a more lasting animal than the pointer, and besides being swifter while at his work, can also do more work; indeed many setters may be hunted for several consecutive days. The "rough" dog is therefore preferred generally for grouse shooting, as the ground to be gone over in a day on the moors is much more extensive than at partridge shooting. In fact, setters require much work to keep them steady; and it must also be particularly noted that they do not hunt to advantage on a dry moor. They delight in wet ground, and take every opportunity of crouching and wading in shallow pools. Both varieties require some work and fresh tuition before the opening of each season; but the setter being, as mentioned above, not a pure pointing dog, and possessing less of the instinctive quality of such, generally requires more of this fresh training than the pointer. It is not to be supposed, however, that all setters are not perfectly

staunch. The author has known of dogs which, having suddenly crouched on a point while the attention of the shooters was otherwise directed, have required other dogs to be sent for to hunt them up—the grouse sitting close, and the brown colour of the setters rendering them, for the time, invisible among the heather.

It is to be feared that some books on shooting are mere compilations. I was astonished to read, in a work published not long ago, the exact reverse of all the well-known peculiarities of pointers and setters gravely stated. The qualities of the dogs, as described above, were carefully given to the wrong variety. Thus a dashing setter was specially recommended for partridge shooting, and so on! Guns and shooting are popular subjects, very tempting to the *littérateur*. But if tempting, they are far from being loose as to their facts, and hence a sad *fiasco* of the subject is not uncommon. The general direction of the popular mind to improvements in gunnery as well as the Volunteer movement have naturally produced wide-spread but shallow knowledge. I can only say that, in gunnery, "life is short, and art is long," and that after more than forty years' study and experience, I am learning where unfledged youths fancy they have mastered the subject; and yet I have never been behind the age, but rather to the contrary. I am induced to make these remarks by the reason that, unless positively false or ignorant statements, necessarily remaining in print, are as positively contradicted, the minds of readers are quite misled. The practical mechanician or sportsman seldom writes—he only knows. The *littérateur* does not know, he only writes.

The above few remarks are perhaps sufficient to show (and it is not intended that this treatise go fully into such matters, which would require a volume in themselves) that the setter is the dog for wide, open country where game sit well to the point, giving time to the shooter to walk up from a distance; and that the pointer is less active but more cautious, and is also a better partridge dog. The setter[9] is a much bolder dog than the pointer, and has many qualities, such as taking the water, which render him a more companionable animal to man. It is more difficult to get a thoroughly good setter than a pointer equal in quality; and, as already stated, there is more difficulty in keeping the former free from faults. Pure blood and good stocks are therefore rare, and their pecuniary value is greatly enhanced.

The more prominent faults possessed by dogs are—running into shot, chasing game on the wing, chasing hares,

[9] The setter will fight viciously if roused, and sometimes is savage in temper. I had one which killed a favourite terrier instantaneously by one fierce bite across the loins. He fought, victoriously, a powerful bulldog, nearly as big as himself, which attacked him in the open street. He so mauled my famous and beautiful small, handsome bull-terrier, "Juba," that it had to be destroyed, to my great concern. This "Juba" was a most graceful and game animal, so swift on his legs that I once saw him course and turn a hare three times, and so courageous that no dog ever attacked him successfully until "Sport" settled him in earnest. I had, finally, to cause this setter to be shot for biting a boy, who, coming into a potato-field when the dog was earnestly and slowly making out some partridges, kindly clapped him on the back. The setter, apparently resenting this interference with his duties, laid the young gentleman's brow open with one sudden assault! He had never bitten any person before, and was fond of my children.

pointing larks and such "trash," and blinking. Inherent faults, as want of a good nose, cannot be remedied, but the foregoing usually proceed from a bad education, or being allowed to ramble when in a state of puppyhood. The author had a splendid young dog spoiled by the herd-boy, at a farm where it was at walk, taking it out to hunt rabbits. The vice, unknown in his stock (the sire was "Punch," a celebrated pointer, the property of the late Mr. John Crooks, one of the best sportsmen who ever handled a gun), was ineradicable; and this shows that, with the lower animals, which cannot reason save in a minor degree, we should begin their education very early, and never permit any one vice to be acquired, else all hereditary good qualities will assuredly be lost.

"Running into shot" is dashing forwards from the point when the shot is fired, instead of dropping flat to the earth, in obedience to the command, "Down to charge," which is a *sine quâ non* in every dog. The command is not always necessary, as good dogs go down so of themselves the moment the gun is fired. Some old dogs, however, will not actually drop, but remain standing, or merely "sit" down; this may be permitted in an old, sagacious animal, but never in young dogs.

"Chasing game on the wing," is the dog following their line of flight when a covey has risen before him; this, like the former fault, is unpardonable. The dog must be broken off it, or is worthless. The punishment given him is accompanied with the words, "'Ware wing; 'ware wing, will you, then!"

"Chasing hares" is less heinous in degree than the

foregoing. Many otherwise good dogs cannot be broken from this vice; others will chase hares one day and not another. Several modes of cure are adopted. A long "trash" cord, say sixty yards in length (used also to exhaust the superabundant vigour of a fresh young dog, by merely dragging it after him, attached to a common collar, with the other end loose), is attached to a collar with spikes pointing inward; a sudden check of this teaches the dog a lesson. Another plan is to fix a triangular collar on the neck, pointing so downwards that on the dog lowering his head to go off at speed, the apex takes the ground and throws him head over heels. Many dogs, when otherwise sagacious, may be broken off chasing hares by simply allowing them to exhaust themselves in the pursuit, and on their return treating them with coldness and contempt, not allowing them to hunt for some time afterwards, if other dogs are in company. A dog knows when he is in fault, and also supposes that punishment wipes it out and restores him to full favour. Hence most dogs after a sound punishment will rise and express their joy at getting it over, when before it they would come creeping in with all the symptoms of conscious guilt. If it be, unhappily, necessary for a sportsman to punish his dog, he should never let the whip twine around him, but lay it along the back, holding the animal by the neck, striking a few light blows, with considerable pauses between. All the while the dog should be addressed in grave, earnest language, telling him his fault. He will understand it better, perhaps, than he may get credit for. Dogs certainly understand the meaning of words

on matters concerning themselves. The Ettrick Shepherd and other writers have demonstrated this. Another excellent method of punishment with a high-tempered, generous dog is not to use the lash at all, but to make him drop and keep him inactive for some minutes; this moral chastisement has often a very good and lasting effect. When a dog is otherwise so valuable as to make it a matter of some moment that he be cured of chasing hares, the best plan to follow may be to send him to hunt on ground where they are particularly numerous, so that he may get familiarized with them, or satiated with their pursuit. Certainly a hare popping suddenly out of a clump of rushes, from before a dog's nose, is a very great temptation to the weakness of canine flesh, and a bit of a spurt after it should be leniently looked upon. The cautionary terms of "'Ware hare," and "'Ware chasing hares," are used in punishing a dog for this fault. The foregoing applies equally to chasing rabbits.

"Pointing larks," when inveterate, makes a dog worthless. It often arises, however, from a dog being fatigued, or from game being very scarce; and when such is the case, fair allowances must be made. When a regular habit, however, the dog possessing it is not worth having. "'Ware trash" is the common term used in checking this fault, which is most tantalizing to the sportsman, none the less so if game be scarce, and the day be hot and fatiguing. Continually "serving" such a brute, and as continually seeing a lark rise before his nose, is about the most disgusting thing in shooting. One's fingers mechanically play with the triggers, and there is a decided ten-

dency to deposit a shot somewhere or other which Ponto might not altogether relish. Having, through professional reasons, and the pressure of business in August, frequently had to start for the moors with such animals as the chances of the demand for dogs had left me, I have had all manners of experiences in canine flesh—good, bad, and indifferent, but of all pests I would avoid the "larker." He is a hypocritical rascal, who makes his horribly deceitful points with all due solemnity and precision, utterly deceiving and decoying the already worn-out sportsman to "serve" him once more, and yet again once more. The name "Bob" for a pointer sticks in my nostrils, through having had sad experience of such a fine-looking, sagacious-looking, but most arrant humbug.

"Blinking" arises from a fear of the gun. Some experienced sportsmen consider that very young dogs should not be permitted to point hares. They say that this is likely to cause blinking, from the reason that the dog, aware that it is wrong to chase, consequently, when puss goes away, leaves his point and goes behind his master in the uncertainty of what to do. I have been assured that being taken too young in actual search of hares—for casual encounters cannot be prevented—is a frequent cause of blinking. Many good young dogs blink at first, and much care is requisite on the part of the breaker. It consists in breaking the point and running behind the shooter when the gun is raised or fired. Sometimes the fear of the report is so great that the dog leaves the field altogether, and goes home or takes refuge in the nearest farm-house. Nothing but the greatest gentleness

will serve to remove this fault. No sportsman worthy of the name will grudge devoting time to such a case. The young dog should be shown the gun; the sportsman lying down on the turf beside him, caressing and encouraging him to look at the gun in different positions, and using every means to make him understand that it is not used with intent to injure him in any degree. A dog, judiciously treated, will actually lick a fowling-piece all over—this I have myself witnessed when engaged in breaking a young setter on a Perthshire moor—and an hour thus spent will never be regretted. When a young dog has accidentally received a shot, the probability is that his blinking is incurable.

Besides these more common and prominent faults, there are various degrees of excellence in dogs, which need not be fully entered upon, neither need the proper number of dogs to be kept or hunted. These specialities are foreign to my purpose. A few additional sentences may therefore serve to dismiss this subject for the present, only premising that the smallest possible number of dogs kept the better. Dogs, like horses, must be regularly wrought to be kept steady.

A good dog follows his master quietly. He never crosses a fence before him—he ranges only at his command of "Hie on," or "Hold up"—he quarters his ground well, missing no part—he redoubles his caution on approaching game, and becomes immoveable when the covey is made out; if the covey runs, or is at some distance, he moves steadily at the side of his master—drops when the gun is fired to allow time for reloading, and only rises

again at the word of command. When a bird is wounded and runs, a good dog "roads it" through its windings (as he also does a single "running" bird); he "seeks dead" patiently, and does not "mouth" the dead bird when found. In ranging, he still keeps his eye on his master at every turn—does not go out of a moderate distance—obeys the sound of the call or the motion of the hand—and generally seems to understand what he is expected to do, and is anxious to do it.

A bad dog rambles about as if without purpose—sometimes before and sometimes behind—now runs right through the middle of a covey, and anon fiddle-faddles where a covey has been. When a hare crosses him, however distant, but yet in sight, off he goes in pursuit. When he does make a point, he rushes in headlong on the gun being fired, and pursues the covey through perhaps the best of the ground, raising other birds as he goes. Lagging behind at one time, the next minute he makes a start right off, and ranges almost invisibly some half-mile away. In a word, he is worse than useless.

But let us say a word on the other side. A good sportsman attends to his dogs—he is particular in checking firmly, yet tenderly, every fault—he is doubly so in the mornings on beginning to hunt, and while the dogs are yet fresh and faults more likely to be committed. He never breaks a rule for a mere shot, or to avoid a little trouble. He remembers that a fault passed over must upset the dog's sense of right and wrong. He encourages his dogs by word and gesture. If by gestures, he makes them fully and properly. For instance, if he

raises his arm, he takes care it be that next the animal—a point of more importance than appears at first sight. In calling to his dogs he raises his voice loudly, but speaks slowly and emphatically, and is even so particular as to name them with sounding titles ending in "O," so as to be easily heard and distinguished, as "Ponto," "Carlo." He punishes judiciously, telling the dog what the punishment is for. He at once controls, admonishes, and gives encouragement as needed.

A bad sportsman hurries and hustles his dogs—he works them into a nervous excitement—he presses them on at one time unduly, at another he calls them "to heel" to steal a pot shot at a covey. The one day he is severe in his rules, the next he hounds his dogs after a wounded hare. He exerts little control; forgets to watch his dogs and to keep near them. He lets them pass into contiguous fields, or on the moors may be said to literally hunt with "Rover" and "Ranger," for roving and ranging wide are the concomitants of his slip-shod mode of hunting.

The loss of sport by hunting young dogs at the beginning of the season should not be risked; and in the afternoons, when the coveys are dispersed, a steady old pointer is the best at picking up the single birds. No rule of hunting should ever be broken by the sportsman himself. The dogs must be properly treated, or be spoiled. There is no medium in this particular, and the education of months may be lost in a day by bad hunting, or the overlooking of faults to save time and trouble. A bad sportsman will punish a dog one day for hare-chasing, and

the next will encourage him in the pursuit of a wounded puss for the sake of filling the bag, or send him into a covert to drive out hares at a gap.

The qualities of dogs are hereditary. It may be enough to state that the rule in breeding should be, that the sire be proportionately smaller than the dam; that the best season is spring, as winter puppies are always inferior; and that the young dogs get abundance of sweet milk. In the choice of dogs to breed from, the great physiological fact must not be lost sight of, that the organs of digestion are generally derived from the female, and of locomotion from the male parent. This rule pervades all nature; and a due attention to it is of the greatest consequence to procure the finest progeny. No dog should, therefore, be chosen to breed from with weak legs, large feet, or a bad style of going, and no slut which is known to have any weakness of digestion or disease in the brain or stomach. Of late years these and other breeding rules are becoming more universally known. I was one of the first among public writers to urge such physiological facts upon proprietors of kennels, and also to advocate "Dog Shows," now so common.

Dogs, being carnivorous, must have some animal food when hard wrought. On the moors a whole sheep may be boiled to a jelly, and a portion mixed every day in the food. Sea-biscuits are strengthening food for the moors, at other times nothing is better than oatmeal porridge. A mixture of oat and Indian-corn meal forms an excellent variety of food. Of recent years the favourite food has been Messrs. Spratt's dog-biscuits, manufactured by that

firm in London. So recognized is the value of these biscuits, that the Government have ordered a large quantity to feed the Esquimaux sledge-dogs during the new Polar expedition, which is saying a great deal, considering that the safety of a whole party may depend on these dogs being maintained in health. Different kinds of these biscuits are made for feeding highly or moderately, according to the amount of work the dog is doing. It is customary to feed dogs only once a day: the best time is the evening. After a day's hunting, their feet should be examined for thorns or cuts, their legs rubbed and dried, and dry bedding be provided. General kennel treatment is out of the range of this work; but common sense may guide the sportsman in providing that the tables on which the dogs sleep be broad and comfortable; that ventilation be provided for; that the supply of water be ample; and that perfect cleanliness be aimed at. The walls should be well washed with Irish quick-lime, to kill ticks and other vermin. For bedding I decidedly prefer fir or pine sawdust to straw or any other litter whatever. The dogs should get a run out twice a day.

Dogs have numerous diseases—internally, worms are the most common and troublesome, and externally, the mange. The best remedy for the former is the areca nut, or roughly ground glass among butter, with a purgative afterward. For common mange a change of food, mild purgatives and mercurial alteratives, and the outward application of sulphur, are the best remedies. For red mange, arsenical preparations are to be depended upon. See "Stonehenge's" excellent Treatise on the Dog—a

book indispensable to sportsmen. Distemper, *Scottice* "the snifters," carries off very many puppies. It seems now to be an ascertained fact that vaccination either entirely prevents or modifies this disease, which is, however, much less virulent when the puppies get plenty of milk and little animal food. Vaccination may readily be performed in the inside of the ear; I have made it my care to frequently put the question of its efficiency to sportsmen, and have found it invariably recommended.

The breaking of young dogs should be entrusted only to men who will carefully educe their capabilities, not beat them mercilessly into the performance of a few set rules. This education may be begun at an early age—say six months; but the young dog should not see game for some months afterwards, or he may learn to "hunt cunning," and not as desired by his master. After his breaking-in is completed, practice, and the killing of game over him, are still required to insure steadiness; so that it may be a good hint to the young sportsman that one good old dog is worth three young ones, and that the heaviest bag is not filled by him who runs fastest over the ground.

The young sportsman is now prepared to take the field, but before entering upon some general remarks upon the choice and management of ground, this may not be an improper place to introduce a few observations upon the causes of accidents.

ACCIDENTS FROM FIRE-ARMS

In the field are very rare, when the extent to which shooting is carried on in this country is taken into consideration; and these accidents occur generally from three causes, the avoiding of which would render the risk very small indeed. These three causes are:—*Carrying the gun with the striker resting on the cap; drawing the gun through a hedge with the muzzle forward; dogs being allowed to jump and fawn upon the sportsman.*

The first of these has been of late years the origin of more serious and fatal accidents than all other causes whatsoever. When we consider how very subtle in their action percussion caps are now made, and how very slight a blow is sufficient to ignite them, it is surprising to find any sportsman continue to carry his gun with the striker down; and yet nothing is more common than to find it so carried, actually as a precaution against accidents. For some years past I carefully read the accounts of accidents from fire-arms as reported in the public prints, and have almost invariably found that they arise from this absurd practice. Although muzzle-loaders are gradually going out of use, still I prefer to let the following stand as originally written. What is more surprising still is, that a very large proportion of sportsmen, after the discharge of one barrel, proceed to load it after carefully and prudently, as they suppose, putting the striker of the other lock down on the cap, thus placing themselves in the most dangerous position

they could choose, next to that of having left the other lock on full-cock, or putting a fresh cap on the nipple of the discharged barrel before loading. I have actually known an instance of the second barrel, under these circumstances, being discharged by the striker coming in contact with the sportsman's knee, at the cost of the forefinger of his right hand. How easy, then, is the discharge of the gun, from striking against a stone or other hard substance! A gentleman wrote me on this topic as follows:—"You are quite right about carrying the hammers resting on the nipples. A friend shooting with me fell with his gun in hand, and so severe was the fall that one muzzle came in contact with a stone and nearly closed it, but by having the gun on half-cock it did not explode." The rule should be to carry the gun always on half-cock, unless game is immediately before you, and never to load a discharged barrel with the other lock in any position but on the half-cock. The rebounding lock will necessarily prevent many accidents, as the danger through having the hammer down is much the same in breech-loaders.

Drawing the gun through a hedge with the muzzle forwards is another comparatively fruitful source of mischief, and is generally in connexion with the foregoing; and perhaps it would be safer to do so with the lock on full-cock than with the striker down. The reason is obvious. The guard is some protection to the trigger being caught by a twig, but there is no such protection against the striker being raised by contact with any part of the hedge, and then let suddenly down upon the cap. As a rule, however, independently of any state of the

lock, the gun should be invariably either shoved before the shooter, or drawn after him, according to circumstances, or whether or not he has companions before or behind him—the stock being grasped by the handle, and towards the person. Of course the locks should be on half-cock.

Permitting dogs to jump and fawn upon the sportsman has led to fewer accidents than the two other named causes, but those accidents have generally been of a most deplorable and fatal character. It is only necessary to say, that no sporting dog at any time, in the field or out of it, should be permitted to leap about his master. The practice is annoying and troublesome at all times, and in the field is positively dangerous. Of course the strict observance of the former rules would greatly obviate the danger, but no rule is without exceptions. There may occur circumstances in the pursuit of various kinds of game, when the gun must be kept ready on full-cock, or where even the click of the lock might frustrate your object. This noise can always be avoided by pressure on the trigger when putting the hammer on full-cock, when the click will be nearly silent. Independently of this altogether, the rule should be strictly observed, that in the breaking of young dogs, leaping on the person should be punished as a serious fault.

Accidents from other causes seldom happen; and it is rare indeed that one sportsman is injured by the discharge of another's gun. The word "sportsman" is used in its legitimate sense. Against the accidents we daily read of from the wanton discharge of fire-arms, nothing

written here could avail. In beating coverts, some degree of caution is necessary, and it is the duty of the game-keeper to place the guns and to give such instructions as the nature of the ground renders necessary; and no written rules would be of the slightest use beyond the inculcating of common prudence in taking up a position and in firing.

It is perhaps superfluous to add that the percussion caps or breech-loading cases should be removed before entering any habitation, and that no gun should be laid aside or put into its case loaded.

Accidents from bursting are very rare indeed, and even when a gun does burst, the shooter is seldom injured—the broken parts of the barrel not being apt to come backwards against him. The most frequent cause of a gun bursting is the stoppage of the muzzle by snow or earth, which, although apparently easily dislodged, will burst the strongest barrel. The whole of that part of the barrel in front of the stoppage is usually blown clean away. It is not required that the stoppage be complete; even if very slight the mischief will be done. This arises from the extraordinary velocity of the expanding gases—some 7000 feet per second—receiving a sudden check. As their expansion is universal—in all directions—the walls of the barrel (even of a strong rifle) are unable to bear the increased pressure suddenly thrown laterally upon them, and the metal is literally blown outward. A solid body would continue in its line of propulsion, but the gases have no line of propulsion, and seek only the easiest exit. Close that exit for

a moment, repel the gases, and they will break through almost any bounds. The slightest stoppage of the muzzle being so dangerous, it should be always examined after there is any reason to suppose a foreign substance may have got into it, such as taking a leap over a peat-hag or among snow.[1] I have already mentioned that if a concentrator remain in the barrel, more or less damage will follow. Hardened shot is alleged to tear off the anterior part of breechloading cartridges: if this be true, as I believe it may be, and that part lodge in the barrel, mischief is sure to ensue. A similar cause ruined the invention of an ingeniously-contrived breech-loader not taking the common cartridge. I dwell thus strongly on this matter, as sportsmen are slow to believe that so slight stoppages will cause a barrel to burst. There is one unerring mode of ascertaining if the metal was in fault, or if a previous flaw existed, and that is, that if there was no flaw, the fracture will be fresh and bright; if there was, part of the fracture will be black or rusted. This is, however, entirely a case to be submitted to an expert in the event of it involving disputes as to the soundness of the metal.

When the charge of shot is not lying closely down upon the wadding over the powder, there is a risk of bursting—hence one of the great advantages of elastic wadding,

[1] A familiar illustration of the power of stoppage at the muzzle to burst a gun barrel may be given. If a water tap be running freely, under considerable pressure, and you shut the cock quickly, a violent strain will be heard to run along many feet of the pipe above, almost threatening to burst it. What then, in comparison with the run of the water, must be the checking of gases expanding at the rate of 7000 feet per second!

which is not easily started by the discharge of the other barrel. Thin, non-elastic wadding is, therefore, unsafe over the powder. This applies solely to muzzle-loaders.

In addition to the foregoing remarks, it is only necessary to add that, when shooting in company, it is dangerous for the gun to be suddenly swung round in taking aim, with the finger on the trigger. The eye alone should follow the line of flight, and at the proper moment the gun should be raised to the shoulder.

Before entering upon a short sketch of the usual manner of pursuit of the principal varieties of game, it may be better here to make a few remarks upon cleaning and preserving fire-arms. After use, the first thing necessary is to wash the barrels well out. This is most effectually done by placing the breech-end of the barrels (the nipples not being removed) in hot water, and using the cleaning-rod, with a plug of tow, or safer and better, a piece of linen rag, as a pump. In fact, the process is so well known as hardly to call for description. After the barrels have been well washed out, place the breech-end upon the floor, and continue the rapid pumping for some time. Then place dry rag upon the cleaning-rod and pass it rapidly up and down until the barrels are quite dry. Finally, with a third plug of rag, slightly oil the inside of the barrels, and also oil the outside, passing the tow or rag used for the purpose through the pipes, and carefully round about the seat of the nipples. Breech-loading barrels may be effectually cleaned without washing, using oil only on the tow, or, what is better,

spirits of turpentine. The latter enjoys the peculiar property of removing any leading, almost equally with quicksilver. Should you require to wash them, never rest the end of these barrels on a hard floor. Have a bit of wood with a flat base and a cylindrical projection therefrom to enter the one barrel, and support the whole on the floor, while you are washing out the other. If the residuum of the powder has hardened on the barrels use oil freely, and leave them awhile to let the residuum soften. Hot water is not essential, and on the moors barrels may be effectively washed in any pool of water. The strikers and mounting generally are to be well rubbed and oiled, and, if necessary, the locks removed and cleaned. It is not advisable that the works of the locks be dissevered, as all needful cleaning can be done without. Upon no account must much oil be put upon the works of the locks; only a very little, and that of the finest quality, should be put where friction takes place, such as on the axle of the tumbler passing through the lock plate, on the swivel, and points of contact between the scear and the scear-spring, and point of scear and tumbler. Neats-foot is the best of all oils for guns, and to extract the water which is present in all oil, and render it still purer, throw some bright new shot, or new clippings of soft lead into the bottle; the lead has an affinity for the water and will extract it. It is the presence of water in oil which makes it improper to put much oil upon guns, or other fine iron-work. The bad effect may be seen in the minute spots of rust which are the result.

When guns are laid aside for a time, plugs of cork or wadding should be put in the muzzle of the barrels. If you wish to be very careful, to protect against trying climates, have a wooden rod, covered with flannel, made to fit each barrel, filling it up from end to end. This prevents the action of the air itself. If a gun is kept in a country-house ready for being loaded in a hurry, let it always stand with the muzzle downwards, so that no dust may fall into the breech and cause a missfire. All guns are best preserved in cases of oak or mahogany, where they are safe from damp and external injury. Of course this remark does not apply to such sporting establishments as possess a regular gun-room. At sea, or on the coast, rub the whole outer parts of the gun, and the inside of the barrels, with turpentine instead of oil. For rough work at sea, the barrels may be well protected by smearing them with the blood of aquatic birds. These hints are given from actual knowledge and experience, as, indeed, are the whole contents of this treatise, and this remark is only made here from the frequency of the question, "What will keep guns from rusting at sea?"

In placing the barrels in the stock, hold the latter horizontally in the left hand; hook the breeches into the break-off, with the barrels at an angle of 45 degrees, and then let the latter fall by their own weight into their place. Never try to shove or force the one into the other. Attention to this trifling hint will save much injury to the stock. When you wish to remove the barrels from the stock, place the gun over the left shoulder, rib downwards, and placing a turnscrew care-

fully under the head of the bolt, which you have previously started by a tap on the other end, force it firmly but slowly out. It is quite disgusting to see the stock of a gun disfigured and destroyed by the careless drawing of the bolt. The same position is the best for unscrewing the side-nail when you wish to remove or replace the locks. These operations may appear trifling, but when carelessly done, a gun is rapidly deteriorated; and I wish to instruct in all really useful subjects appertaining to shooting. A common fault in books intended to be instructive on unfamiliar subjects, is assuming the reader to know about as much as the writer on all the less prominent details, and perhaps the great secret in conveying instruction is simplicity and reiteration.

To dismount a breech-loader, open the lever, draw the bolt,[2] unship the fore-end, and gently unhook the barrels from the stock. To mount a breech-loader, hold the stock horizontally in your left hand, with the lever open, hook on the barrels to the hinge, throw the gun over with the rib and hammers downwards, holding the stock by the handle (behind the locks), this will retain the barrels in their place by their own weight, then affix the fore-end and push the bolt home. All these operations should be performed with the locks on half-cock.

[2] A recent improvement does away with the old bolt, and puts a catch, acted upon by a lever or piston, at the extreme point of the fore-end, exactly where the ramrod enters the stock of a muzzle-loader.

THE CHOICE OF GROUND

Is important to the young sportsman, who is too apt to overlook circumstances which may render 1000 acres in one place as good as 3000 in another. It will suit the present purpose and space to put the following advice in the shape of rules—or rather hints.

In the choice of a moor, first learn the nature of the ground—if it is all or only partially heathery, hilly, or flat—if the heather has been lately burned—what are the contiguous lands, and how shot upon and preserved. If flat, the grouse will sooner become wild; if very mountainous, and far from cultivation, the birds will leave for lower lands as autumn advances. Low-lying moors, near cultivation, may not afford good bags at the very beginning of the season, but if near mountainous country will, on the other hand, be stocked thence in autumn. Avoid moors with open or common ground contiguous; also, try to learn if there are peat-mosses in the centre (often the case), from which the neighbouring cottagers procure their fuel. If so, you may rest assured that, if not prevented, the collies are busy chopping young birds as rapidly as their masters are casting peats. This is one reason why moors, apparently well stocked in April or May with abundance of nests, if not preserved, show so few young birds in August. Stony and grassy lands may afford hares and some few black-game, but are worthless for grouse.

The best grouse lands have high dry clumps of heather

favourable for nests—no part being far from water, with undulating swells and hollows. Heathery hillocks afford excellent basking ground for grouse, and also give concealment to the approach of the sportsmen. Flat ground gives no such shelter, and the birds soon become unapproachable. Grouse generally become sooner wild south of the river Forth, except in Argyleshire, than in the more northern parts of Scotland, but the southern birds are larger, and also earlier on the wing. When only a few days' sport at the beginning of the season is desired, the southern moors are therefore excellent. In Argyleshire grouse sit well throughout the season unless the weather be very stormy.

But the most particular circumstance connected with grouse shooting is the amount of burning of the heather which has recently taken place, or is proposed to be done, on the shootings. This burning destroys the old, and brings up a crop of new heather. This is a matter of so much importance that there have been several statutory laws passed for its regulation. The last is that of 13 Geo. III., cap. 54, which repeals all previous Acts, and provides that any person setting fire to any heath or muir in Scotland, from the 11th day of April to the 1st day of November, in any year, is liable, for the first, second, and third offence respectively, to a fine of 40 shillings, £5, and £10 sterling, or to imprisonment, for non-payment within ten days, for six weeks, two, and three months. The tenant or occupier of the ground will be deemed the party guilty by his own act or that of his family or servants, unless he can prove otherwise. On high lands the

heather may be burned up to the 25th April, provided that the tenant receive written permission from the landlord or his factor, and that such permission be recorded in the county Sheriff Court books. Prosecutions must be begun within six months from the date of offence. This statute is termed the Law of Muirburn, and by the word muir is not meant heather only, but the nature of the ground; and withered grass, whins, broom, bent, and other vegetable productions growing upon a moor, are all included.

Farmers are not likely, for their own sake, to burn too much heather in one season, still the young sportsman will see how closely this must be looked into, as an extensive muirburning may alter for some years the whole value of a shooting. It is customary also on many farms to gather and drive the sheep about the 13th of August, and the extent and date of this annual driving may be worthy of inquiry, and provision made that it be not done capriciously and vexatiously—I write this from sad experience. The question of burning moors has been keenly debated as to its effects on the abundance of grouse. It is a great pity that in all such controversies the extreme point of view is taken. Men, led away by their sympathies or interests, will not condescend to admit the possibility of any truth on the side of their antagonists. Because young heather feeds grouse, one side wishes all young heather—burning, say they, can do no harm. Because old heather shelters grouse, the other side would burn none. Truth, as usual, lies in the middle; burn regularly, and not too extended tracts at

once, and it is worthy of note that what is good for grouse in this matter is equally good for sheep.

Of recent years, to avoid the admitted evils of burning, the experiment has been pretty widely tried of cutting down old heather with the scythe. The plan has been too short a period in use to justify any conclusion; it seems feasible.

It is also most amusing to see the question of the comparative abundance of grouse debated in the most irregular manner in newspaper columns. Thus, correspondents will argue from the general to the particular, and because agriculture is reclaiming moorland here and there in Scotland, insist that on every estate the numbers of grouse must decrease; whereas they might swarm in one county, although those around possessed not one bird. The general whole may decrease while the special increases. It is to be feared that good sportsmen are not always good logicians. Perhaps they are all the better for it. It will fare ill with a country when the men are all head and no heart—the men book-worms, the women blue-stockings. A rollicking hunting cheer is often better than a dry syllogism.

I cannot leave this branch of the subject without referring to what I have been gravely assured of:—that, by an ancient special treaty between France and Scotland, the burning of heather in the latter country was placed under special rules and limitations, from the belief that undue burning there produced disease in the French vineyards! I have been at the trouble to make search in vain for historical evidence of this treaty, going over

all the Scottish Records of several centuries, but from the respectability of my informant do not refuse it credence. Having taken some interest in this curious question, "if this should meet the eye" of any reader who can throw any light upon it, I would gratefully hear from him.

Low country shootings should have good large coverts in their centre, with stripes of plantation here and there. Very flat, highly cultivated ground, where the stubble is cut as short as the grass on a lawn, affords smaller shelter to partridges and hares than where there are occasional fields abounding in rushes, with broken ground full of whins and similar shrubs. Beech hedges are excellent for partridges. If there be no good coverts on the estate, every hare, and nearly every covey of birds you put up, will make straight to the nearest, thus giving small chance of a second find that day. Green cropping gives good shelter to partridges; and, generally speaking, you cannot go wrong in the choice of ground if there are good hedges and a fair extent of wood, but bare, stone-fenced, and woodless lands will never afford good sport. The existing stock of hares can easily be estimated by the number of their runs; these not being to be found, you may put down the available stock at "nil," any protestations to the contrary notwithstanding. Numerous roads through an estate give opportunities for the practice of all kinds of poaching. The character and density of the neighbouring population must also be taken into account. As to the abstract question of the propriety of preserving game, it is enough here to say that the security to property and fences created by moderate game-preserving far outweighs, in the eyes

of all judicious farmers, the value of the occasional food of the game. One great error has been the belief that partridges and pheasants live entirely upon grain, while the true fact is, that these birds consume, at the most critical period of the season, whole myriads of wireworms and other most destructive insects. Partridges are particularly beneficial to the farmer during the rearing of their young, by this wholesale slaughter of noxious grubs. Rabbits are the only animals of the game kind very injurious to crops, and should be kept down in summer. Over-preserving of game, for the sake of *battues*, has led to much of the outcry against the game laws, which, if repealed to-morrow, without some very similar safeguard to land-proprietors and farmers, would very soon be again called for. Suppose that the game laws were repealed, a stricter trespass act would be required, while the farmers themselves would find that landlords would retain the privilege of killing game in granting leases. That trespass act would lead to a greater popular clamour than before. Damage from excess of game is always recoverable from the landlord or lessee of the shootings; and farmers lie under a great mistake if they suppose that the abrogation of the game laws would improve their position. Allowing that they might be satisfied with a very stringent trespass act, there would be an immediate outcry against it from the public in general, and it would likely become a dead letter from the impossibility of enforcing it; while the expense of watching the lands would be transferred from the proprietor or lessee of the shootings to the farmer. The truth of the above remarks has been

fully proved since they were first written, by the almost universal adoption of stringent game laws in the American States.

As a general rule, no shootings should be taken without previous inspection; if personal, so much the better, but at all events by a trustworthy person. Grouse moors should be hunted rapidly all over, doing as much as possible in one day. An interested keeper, who knows the ground, may otherwise, according to the direction of the wind and other circumstances, lead you to where the birds will be congregated (to use a somewhat inapplicable but expressive term) on that particular day, or period of the day. He may, and often will, contrive to show you the same grouse twice over, while you are in the belief that you are viewing, and are making a mental note of, fresh birds, instead of those to which the enthusiastic "green jacket" had already called your excited attention. "Jist look there, sir; anither pair, and anither, and anither jist beyont a bit! What a 'twalfth' this wull be, sir! We'd better sit doon a while an hae a wee drappie whiskey on the heed o' sic a by-ordinar comin season." You fall into his assumed ardour with all a sportsman's sympathy—the landlord, or the factor, or the lawyer does the rest; the lease is signed, then come the realities! Another good rule is to apply to the previous tenant for a description of the ground and list of the game killed. Grouse moors vary according to the state of the weather; some days countless birds may be seen, on other days none, so that a moor ought to be viewed more than once. Grouse may be judged by the

amount of recent droppings; partridges are not so easily estimated; but the abundance or scarcity of hare-runs will at once show if there is a fair stock of hares. Many good shootings derive their game from contiguous lands, which must be taken into consideration, even if a scarcity of breeding birds appear in spring and summer.

No shootings can afford sport without the superintendence of an efficient, and, above all, a sober and prudent gamekeeper. No keeper, *fond of drink*, or open to bribes, ought to hold the office. I have here a word to say for the knights of the green jerkin. No men have harder or more responsible duties to perform. They are also beset with numerous temptations; and it is a dangerous policy to pay a gamekeeper scantily. The "keeper" is also too apt to be looked upon by the general members of a household as a half-idle official who may run with a letter here, or be sent after some runaway cattle there. Now the fact is, that no routine of duties can be more regular and exact than a gamekeeper's. Trapping is perfectly essential to getting up a stock of game, and there need be no attempt at such without the vermin being regularly and systematically destroyed. This emphatic statement may dismiss the subject—that the judicious trapping of vermin is the sheet-anchor of the sportsman. Then poachers must be watched by night and day—dogs must be exercised, physicked, and trained—and altogether there is a multiplicity of work to attend to which makes a gamekeeper's life far from being a lazy

one, while the necessary trustworthiness of his situation calls for adequate remuneration.

A deputation, written upon a 35*s.* stamp, gives the gamekeeper the due authority to protect your lands. The following is the form of a deputation by a proprietor; some slight verbal alteration may be necessary in that granted by a tenant of shootings. The writing must be on one page only of the stamp, or be so mentioned, and have no interlineation, erasure, or marginal addition:—

Know all men by these presents, that I, of in the county of have, by virtue of the statutes in such case made and provided, nominated, authorized, and appointed, and by these presents do nominate, authorize, and appoint residing at , in the county of , to be my lawful gamekeeper, to preserve and kill the game within the said property, for my sole use and immediate benefit; and farther to do, execute, and perform all and every act and acts, thing and things, within the limits of the said property, which by virtue of the statutes in such case made and provided, or of any laws of this realm, belong and appertain to the office of a gamekeeper, during my will and pleasure, and for which this shall be sufficient warrant. In witness whereof these presents, written upon stamped paper by , are subscribed by me at on the day of before these witnesses and (Signed)

, Witness.
, Witness.

While our hand is in these law forms, here is the authority to kill hares:—

I, do authorize to kill hares on my lands within the [parish, county, or other place, as the case may be] of
Dated this day of Eighteen hundred and

This authority should be written by the granter's own

hand, and be subscribed by two witnesses, who must give their profession and residence. The lord of the manor is the only party competent to grant such authority, and he can authorize one person only, at one and the same time, within any one parish. No tenant of shootings has such power, but, any person being in the actual occupation of any inclosed lands, has the right to kill hares therein without a game certificate. There is no form expressed for Scotland—the above is from the English Act of 1848. Through minor changes in the law of late years this may not now, 1875, be literally correct, but I think it is generally so. Some years ago, I heard a doubt expressed by an able lawyer as to the requirement of a stamp to render the authority efficacious and beyond cavil, but am not aware of such stamp having been ever found necessary in practice. Hares may be coursed with greyhounds without a game certificate, but no authorization legalizes undue means of killing, as by poison or by shooting by night.

THE ART OF SHOOTING.

Part II. Its Practice.

THE young sportsman may now be supposed to be fully equipped for the field. He has "his dog and gun" in full efficiency. The former well-broken and seasoned for the campaign, the latter exactly fitting his eye, and become familiar to his hand. He can wield it with ease, and requires no manœuvring to catch the centre of the rib in looking along the barrel. Anxious to instruct, the author will run the risk of appearing to *dwell upon trifles*, rather than of being obscure. In this spirit, then, he proceeds to teach the young sportsman in

HOW TO LOAD.

THIS head embraces not only the mere act of charging the gun, but also the various sizes and quantities of ammunition.

There are two principles of charging a gun—one, to use a large quantity of heavy shot, and little powder; the other, less shot, of smaller size, and a full charge of powder. Both systems have their advocates, but the

latter is the more generally practised, and it is the most honest way of firing at game. It may be perfectly true that 2 drams of powder and 2 oz. of No. 1 shot may be a very destructive charge in a 12 bore $7\frac{1}{2}$ lb. gun, but it is uselessly so, the great weight of the pellets wounding game at long distances, not so as to immediately kill, but ultimately causing a lingering death by suppuration, caused by pellets lodged under the skin. This system, therefore, though strongly recommended in a well-known work on shooting, is most properly little practised. I have known the game on a moor nearly exterminated, but not bagged, by this style of shooting—the bones of the grouse whitening on the heather for a year afterwards.

Some barrels shoot well through weight, but thorough good barrels shoot well from elasticity and proper boring. The former require a heavy charge of powder, the latter do not. But, by the newest system of boring, extraordinary advantages are gained, as I have elsewhere mentioned by large charges of powder and light of lead. On the old system, assuming 14 bore, and 7 lb. weight, as an average gun, let the flask be set at $2\frac{1}{4}$ drams of No. 2 powder, and with this use 1 oz. No. 6 or 7 shot, and $1\frac{1}{4}$ No. 5. Of Nos. 3 or 4 shot, use $1\frac{1}{2}$ oz., and two drams powder; or you may very safely use $1\frac{1}{8}$ oz. No. 6 shot, with $2\frac{1}{2}$ drams powder. There is no exact rule, as guns have, as it were, ways of their own, and it may appear somewhat strange to say that the author has seen the force of some guns increased by decreasing the charge of powder—yet such is the fact. Of recent years great changes have been made in loading propor-

tions, but the above is correct with No. 2 powder, with the following addition :—

Only a comparatively few years ago fine-grained powder was all the rage—burning quickly, with a sudden discharge. Now, coarse-grained powder, slower in ignition, but accumulative in propulsion, is in greater use. The charge of powder is increased; $2\frac{3}{4}$ drams being now thought a moderate charge, using the same proportions of shot as formerly, and 3 drams are in common use to 1 or $1\frac{1}{8}$ oz. of shot. As a general rule, the wider the calibre the coarser may be the powder, and when a gun is found to recoil, let a coarser-grained powder be used.

Short barrels should be charged with more finely grained powder than long. The coarse-grained powder burns more slowly, and may be driven more readily unburned from the muzzle, although the width and consequent shallowness of the charge militates against this, especially with good wadding. Long barrels, say 32 to 34 inches, will consume more powder than shorter, and hence such a gun may be effectively charged with even $3\frac{1}{2}$ drams of powder, driving one ounce of 6 or 7 shot with great velocity. But taking 14 as a medium, let, under 7 lb. weight of gun, the powder be 2 drams of No. 2 or a little more of No. 3, and the shot be 1 oz. No. 6—and above 7 lb. $2\frac{3}{4}$ (to $3\frac{1}{4}$ of No. 3) drams and $1\frac{1}{8}$ shot, and very safe charges are reached. Let it be borne in mind that it is better always to decrease than to increase the quantity of shot.

On proceeding to the field, the gun is supposed to be perfectly clean, and the breech and nipple to be free from stoppage—the strikers resting on the nipples. Placing

the but of the gun upon his left foot, and holding the barrels perpendicularly and well out from his person, let the young sportsman, by a rapid inversion and shake of the powder-flask, with his forefinger firmly placed upon its mouth, fill the top with powder, and pour it down the barrel farthest from him—and repeat the action with the nearest barrel. Then placing a wadding in the muzzle of each, he rams both home, striking one good solid blow upon the wadding to send the powder up the nipple. Then returning the ramrod to its place, he pours in the shot, holding the pouch at an angle of 45, not perpendicularly, and then repeats the ramming down in the same manner as before, but not striking the ramrod home, and observing to hold the gun perpendicularly, and giving it a slight shake to make the shot lie level. In both instances, enter the ramrod a few inches, and then raising the right hand to its upper end, bring it home by one continued motion of the hand downwards, and not bit by bit. The old couplet correctly says, what equally applies even yet to breech-cartridges—"If you wish to kill game dead, ram your powder but not your lead." On finally returning the ramrod to its place, raise the gun with the left hand also by one motion, grasp it immediately behind the locks with the right hand, then in front of the locks with the left, and half-cock the locks with the right. Do this in a regular and formal manner—one—two—three—four—and you will acquire a dexterity enabling you to load in one-half the usual time. Place the caps firmly down upon the nipples, and the process of loading is over. On firing and proceeding to reload, if your gun has any

tendency to miss fire, lower the muzzle, holding the gun in the left hand, and strike it forcibly on the heel of the but with the right palm. If only one barrel be fired, see that the other lock be on half-cock, load as before, and do not remove the shell of the exploded cap until about to put on a fresh one. Always hold the gun well from you, and never load in a hurry under any circumstances whatever.

Should, from any cause, a percussion gun miss fire, unscrew the nipple at once. If you have not a nipple key (which you should have), try to get the nipple filled with powder by the orifice—a small funnel is sometimes used for this purpose—pricking the powder down with a pin; never put a hard needle into a nipple—it is pretty sure to be broken into it: a common pin is the safest. If your gun is apt to scatter, use as slack a wadding as is consistent with safety over the shot; and on the other hand, a full-sized wadding for a weak, close-shooting gun. Also you may, in loading one barrel, put the ramrod down the other to replace the wadding over the shot, in the event of it having started. If by inadvertence you have allowed any pellets of shot to fall down a barrel while the ramrod is in it, they will wedge it in, and you may pull upwards in vain; but invert the gun, shove the ramrod home, and the pellets will drop out. This happens not unfrequently with inexperienced sportsmen. In ramming home the wadding, observe that it lies flat across the barrel, which is made certain by a little caution at first.

HOW TO LOAD BREECH-CARTRIDGES.

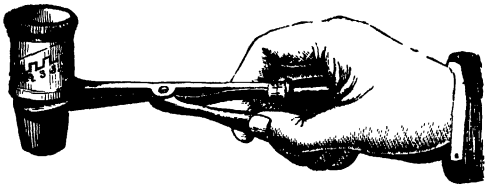
In this country breech-cartridges are in a great degree supplied ready loaded by the gunsmiths, but so many sportsmen prefer loading their own that a few words may be usefully written on the subject. The tools used form a part of the equipments of every gun-case, except the useful but more bulky instrument known as "Erskine's Loading Machine," in which 50 or 100 cartridges are charged at a time.

In charging breech-cartridges, the first thing to see to is that they be of proper length, nearly reaching to the anterior end of the chamber in the gun-barrel. If after being discharged they extend beyond, and into the barrel proper, they will not only be difficult to extract, but cause excessive recoil. If they be much too short, the shooting powers will be injured. This still more forcibly applies to rifles.

The powder should be coarse in grain, not smaller than No. 3, and larger for preference for barrels over 28 inches. The wadding over powder should be thick and dense; that over the shot may be as thin as the sportsman pleases to use, with this proviso, that a close but weak-shooting gun will give a better spread and greater force with more resistance in front.

The powder should be placed in a bowl, and be scooped up with this most useful instrument (the invention of the author, and to be had wholesale of Messrs. Bartram and Co., Nimrod Works, Sheffield), then stricken off level so as to insure exact weight; the bottom being then

inserted within the muzzle of the cartridge, and the lever pressed upon by the thumb, the powder falls in, and not



a grain is lost. In loading with Schultze powder, equal correctness in weight will be given, but with this explosive it is well to give the instrument one or two taps on the edge of the bowl to settle the powder down before striking it off. In both cases the powder should be well, but by no means unduly, rammed down. Schultze's powder requires no more ramming than black, both being governed by the old rhyming couplet quoted above.

It is better to charge a number of cartridges, say 25 or 50, at a time before proceeding to put in the shot, which is also best done with one of the above instruments, made of a different size for shot. The wadding over the shot should fill up the cartridge to within a full $\frac{1}{8}$ of an inch from the muzzle, which part should then be turned down with the proper instrument slowly and carefully, with prolonged rather than violent rotation and pressure, so that the pellets do not shake within, or the cartridge be bulged or wrinkled. Have no loose shot lying on your table. Accidents in central-fire cartridges have occurred through the cap inadvertently, at the moment of ramming

down, resting on a pellet and so causing an explosion! Generally, the process is perfectly safe, and it is one of the many excellent qualities of breech-loaders and their appliances that, if a cartridge do explode among a number of others previously closed, even being in a confined box, it does not ignite any other one of them: hence their perfect safety in transit, a fact gradually dawning on the minds of railway officials, to the benefit of their shareholders, as a very large and increasing traffic goes on during the shooting season. From the same reasons these cartridges are perfectly safe in storage. Cartridges are quite safe to carry on the person, either in a slung pouch or in the pockets. It is at first sight an almost unaccountable but most certain fact, that, if a paper cartridge, not confined in a gun barrel, do explode, the shot will be projected with no force, but literally roll out and fall harmlessly to the ground! I have often seen this purposely done in the hand for amusement! Here be a nut to crack for the many who believe all these "gunning" matters to be of the utmost simplicity. Of course to the initiated the cause is plain enough. Cartridges are best to be newly loaded, with the exception of those charged with Schutze powder. Indeed it is one of the merits, or demerits according to the stand-point, of this explosive, that both in bulk and in cartridges it improves with time. I need hardly say that all cartridges, loaded or unloaded, should be kept in a dry place. It may be specially added, that it would improve badly-shooting guns to mix some fine bone dust with the shot; the regularity of the shooting would certainly be increased.

ON TAKING AIM.

It has been already mentioned that the greatest dexterity is attained by shooting with both eyes open. The gun may become quite familiar to the hand by being frequently lifted, in a room or anywhere, taking aim at an object with both eyes open, and then closing the left eye to ascertain if the gun be bearing directly on the object aimed at. In this way the young sportsman may so far learn to shoot without firing a shot—more lucky than the youth sung of by old Hierocles, who resolved not to enter the water until he had learned to swim—because if he once acquire the knack of instantaneously covering his object, he has but to gain nerve and judgment in the field to make him a good shot. Let this knack be once certainly acquired, and the rest follows as a matter of course. The mere power of taking a rapid and correct aim will not make him a skilful sportsman, or even a certain shot, but it forms the groundwork of his future skill, and practice will do all the rest. The ability to kill game with certainty is as much attained by a knowledge of their mode of flight as by manual dexterity in handling the gun. Thus many men are famous for hitting such objects as a penny-piece thrown into the air, who cannot kill game well. But that dexterity in throwing the fowling-piece into a line with the object of aim by an instinctive effort, keeping both eyes firmly fixed and following the flight of the object, is the first great principle in shooting well. This dexterity may be easily gained by

frequently handling the gun as directed above, without actual firing. Many gentlemen have been rapidly taught to shoot in this manner by the author.

A frequent subject of discussion among sportsmen is the position of the left hand in firing a gun. The question raised is, Whether it should be well extended, grasping the barrels at a considerable distance from the breech, or immediately in front of the trigger guard? A long consideration of the subject, and much observance of the different styles, have convinced me that the question is quite an open one. The former is the crack mode, and certainly looks more stylish, while some of the best shots I have ever known prefer the latter. The probability is that much depends upon bodily configuration and muscular power. I observe that tall and strong men prefer to extend the left arm. My own system is most peculiar, acquired I cannot tell how. Supporting the gun entirely by the right hand, I half close the left immediately in front of the trigger guard, the thumb and forefinger being uppermost, and upon these the gun merely rests, as on a cushion. All the time I draw the left arm firmly backward, the bow of the guard being the *point d'appui* for the hand. The left hand, therefore, exercises little sway upon the gun in directing its aim. There is not the slightest wish to recommend the adoption of this system, which is here mentioned, as an extreme case, to illustrate the opinion, that either mode may be safely practised. The hand in front of trigger guard is certainly the safer, and possibly quicker, through the left arm having to perform a much smaller segment of a circle in bringing

the gun round, either to right or left. Practised pigeon shots almost invariably fully extend the left arm. But in pigeon shooting it is of prime importance to support the muzzle well. There are few cross shots, the birds as a rule going right out, and keeping the muzzle well up helps to prevent shooting low and behind, good pigeons going off at great speed if once well on the wing. The aim must therefore be taken high, or the shot will fall behind.

RABBIT SHOOTING.

THE very best initiatory practice is shooting rabbits, and this sport is also one more readily to be had by young beginners than at the higher branches of game. For various reasons therefore, rabbit shooting will be the first discussed. This is practised at all seasons; but, except the young, which make excellent food, they are in good condition for the table only from the end of October until the beginning of March. They are generally to be found either in thick coverts or in burrows. The former are hunted with cockers or terriers trained to the pursuit, and ferrets are used in the latter, to drive the rabbits from their retreats.

In rabbit shooting in coverts, great quickness in firing is necessary; and it is this which tries the nerve and gives dexterity to the hand of the young shooter. He should walk quietly and watchfully through the covert

(as the rabbits, when put up by the dogs, run hither and thither) and pause now and again to listen for any sounds. In all cases while you stand on the watch for any kind of game remain perfectly motionless. They will then more readily come within range. Imitate the cockney sportsman who, when a cry got up that a hare was coming, gallantly maintained his ground, shouting, "Let it come on! Who's afraid?" But this is a digression. The best course is always along or towards a clear space, free from underwood, so as to get a fair aim should a rabbit cross it, when the gun must be fired at once. The eyes should be fixed on the head of the rabbit, as if that were the whole animal, and the gun will then do its duty, and the shot not strike behind. Rabbits are so active and tenacious of life that unless severely hit they are almost certain to get away if there be a burrow near; being also very acute in the organs of smell and hearing, never hunt down the wind or walk upon the top of the burrows. The range at rabbits is short; unless running right across the line of aim, their small size, thick fur, and tenacity of life, render killing very uncertain at any distance above thirty yards. Nos. 5 and 6 shot are the proper sizes.

FERRETING RABBITS

Is an exciting, and, in good weather, a very pleasant sport. A fine, calm, sunny day is the most suitable; and no other variety of shooting is more calculated to teach

the young sportsman the several virtues of patience, quietness, and promptitude. The picture formed in ferreting is often quite as good as a bit of Landseer. The cool, listening, and picturesque attitude of the gamekeeper—the more ardent and expectant position of the several "guns"—the sagacious face of the retriever, who seems to say, "I know the game you are playing as well as any of you"—and the generally rough and scrubby foreground—combine to render "ferreting" quite an artistic and engaging pursuit.

The rabbits seldom "bolt," as it is termed, immediately on the ferrets being put in, but when they do, there is no time for thinking—"sharp's the word"—and the game must be well killed, if the bag is to be filled—(this involuntary rough couplet may in course of time become a rhyming adage, who can tell?)—as rabbits carry off a heavy shot, and soon disappear in the next burrow they reach. The gun should be thrown well forward, even in advance, and discharged at once, if the aim can be taken at all, as the chances are against a second sight of the rabbit being obtained. With a good eye they may often be hit, even though they have disappeared, by firing through the brushwood right in the course they are taking. This the author has often seen done by himself and others. When one rabbit bolts, it is pretty certain to be followed immediately by another. No. 6 is the best size of shot for this sport, in which the young sportsman has three things to recollect:—to keep quiet; to avoid a position where he can easily be seen from the mouth of the burrow, which keeps the rabbits from bolting; and to

take good care not to shoot until the rabbit is quite clear from the mouth of the burrow, else he may kill still more than his most sanguine wishes would desire, viz., the ferret itself. Should the ferrets "lie up" in the burrow, it is dull work waiting on them. Sometimes an assistant has to dig them out, an operation quite *infra dig.* of the sportsman, who should at once move off in quest of further sport, either with another ferret, or in search of outlying rabbits. Some ferrets must be muzzled when hunting, but the right sort of thing is a small, plucky, unmuzzled animal, too light to hold a rabbit when it seizes him. The best mode of drawing the ferret from the burrow is to open a newly-killed rabbit, allowing the scent of the warm entrails to penetrate the burrow. If this fail, the spade, where the nature of the ground permits its use, must be resorted to. Puffing tobacco smoke into the burrow has been tried, with success, to drive out "lying up" ferrets. These savage little animals are peculiarly repugnant to many people. There is a snakiness and a cool malignancy in their nature and appearance which quite justify this feeling. They should not be entrusted among young children, as they have quite a scientific knowledge of the exact position of the jugular veins, and are always treacherous, and not to be safely handled by unskilful strangers. You may always, however, safely lift a ferret by the tail or by the neck, clasping the latter round firmly but gently with your forefinger and thumb. As it is impossible for the gamekeepers to be everywhere at once, and time being so valuable in ferreting, every young sportsman should learn how to instantly

lift them, and with a proper system a bite is impossible. Although I have a natural dislike to these animals, and can only reluctantly handle them, yet I have always made it a rule at ferreting to assist by lifting them, and have never once been bitten.

Ferrets, being originally from a warm climate, are very delicate, and it is said that if you handle their young ones the mother will destroy them. They are seldom kept so cleanly as they require. What is needed is perfect shelter and warmth, but with the means of taking fresh air when they are inclined for it. A gentleman of great practical sporting experience, who has kindly given me several hints by naming subjects likely to interest readers, writes, that his gamekeeper has found cats' flesh "a sovereign remedy for many diseases in ferrets."

One of the most extraordinary results of a shot I ever saw—and in my time I have seen some strange ones—was while ferreting rabbits at the late Sir James Boswell's of Auchinleck. One of the "guns" fired at a rabbit "bolted" from a sloping hole on level grassy ground. The mouth of the hole entered at right angles from the direction of the shot, and was quite invisible from the position where the sportsman stood. The ferret, a valuable one, not appearing for some time, the gamekeeper went forward, and, thrusting his arm into the burrow, drew out the poor animal, quite dead, one pellet having penetrated its heart. In this case the pellet of lead had struck a pebble, or other hard substance, in the grass, and had its original line of flight altered to one exactly at right angles. How may this authentic and true anecdote not

bear on criminal jurisprudence, where it is often impossible to reconcile conflicting evidence on death caused by the discharge of firearms![1]

HARE SHOOTING.

THERE is a simple rule in hare shooting, attention to which will very greatly simplify the matter, viz:—under every circumstance, to fire at the tips of the ears, letting these alone be your mark. All other rules are contained in this one; still it is necessary to exemplify this more fully. For instance, when a hare is running straight from you, the ears form the proper mark; but if running across ridges, never fire while she is descending from the crown of the ridge, but while ascending from the furrow

[1] I remember a case, happening some years ago, the trial of which caused great discussion and excitement. A respectable man—a surgeon, if I recollect aright—was tried, in London, for feloniously discharging a pistol. The scene was a yard, surrounded by walls. His plea was that he did shoot the pistol in one direction, and, to his own astonishment, hit the person injured (or killed), whom he only wished to frighten, and who was standing in quite another direction. I clearly saw from the whole of the evidence he produced to prove this that the prisoner's statement was true. The bullet had glanced from wall to wall, like a billiard-ball from the cushions. Many years ago another youth and I were amusing ourselves by firing a pistol at a mark on a tree. After one discharge we advanced to examine the shot, and, while doing so, quite several seconds after I had fired, the bullet fell perpendicularly between us, touching the wrist of one of us as it fell! It was still warm when we lifted it.

to the crown, which will throw her ears fully into view. If a hare happen to run right towards you, the ears would still be the mark, but this is the most difficult shot of all, and the proper mode is to remain perfectly motionless until she is within 30 yards, then by a slight motion or sound to attract her attention, when she will turn off after a pause, and afford an excellent shot. A hare running across may be killed at a long distance with No. 5 shot—even heavier is used with deadly effect—but it is inconvenient to load with a larger size unless hares alone be looked for, which is seldom the case with the genuine sportsman. A thorough good gun will knock over a hare, running broadside, with 4 or 5 shot at 70 yards distance, but full elevation must be taken, and the gun smartly fired with the head well raised and the eyes kept steady upon the aim. If the reader consider for a very short space the effect of looking at the hare only at this long distance, he will at once perceive the rationale of not taking his sight along the rib, with his eye well down behind the breech, as is most erroneously recommended in a well-known book on shooting. Distance requires elevation in proportion. A rifle is fitted with graduated sights to meet this, but the elevation of the rib on a fowling-piece is fixed and immoveable. But by a simple law in perspective, when you look at a hare at 70 yards, bringing mechanically the sight at the muzzle to bear upon her, you must have the breech of the gun lower than if she were only 40 yards off, whereas, if you adopt the one-eye system, you fire at exactly the same elevation at all distances, because your fowling-piece possesses only one fixed elevation. It is the non-percep-

tion of this that has given cause to so much bitter controversy on the effective range of fowling-pieces. It would be as absurd to take a level aim along the rib at 70 yards, as it would be to fire a rifle at a mark at 200 yards with the sight set for 100.

The strength of guns and their power of carrying a large charge of powder have been greatly increased during the last 45 years. The shape of the barrel has been altered and its calibre widened. Ezekiel Baker, a good authority, writing some 50 years ago, gives $1\frac{1}{2}$ to $1\frac{3}{4}$ drams of powder, and $1\frac{1}{2}$ to $1\frac{3}{4}$ oz. of shot, as the proper charge for guns weighing 6 lb. 4 oz. to 6lb. 12 oz. It will be at once apparent, that a gun carrying $2\frac{1}{2}$ drams of powder and only 1 oz. of shot must possess a greatly-increased range. But $2\frac{1}{2}$ drams is now, 1875, quite a small charge of powder. The question then comes to be—Here is an enormous increase of power, can a gun be so made as that it shall not scatter in proportion? If it can, the effective range must be about doubled. Now, while the small charge of powder was in use, Colonel Hawker declares that at 50 yards the chances are three to one that a bird be killed with a good aim. There can be no doubt that, by modern improvements, what was said by Colonel Hawker of 50 yards may now be said of 70, but the elevation must be very much greater. Here, then, is the question which has been so keenly disputed in the columns of a London periodical. Should a gun of $7\frac{1}{4}$ lb. in weight shoot so as to give a regular power of killing a hare, running broadside at 70 to 75 yards, with No. 5 or 6 shot? It certainly should. No doubt the eye will be more easily

deceived at 70 than at 40 yards as to the rate at which game is going, and from the natural obstacles to getting a clear view the average of killing shots at the longer range will be much smaller. But that is not the question. What is the gun's power to kill if properly aimed with? All this can only be proved at a target; taking means to ascertain velocity as well as closeness in shooting. The author maintains that this power is attainable, and that the reason why in practice the range is not lengthened, is because the question of elevation has been nearly lost sight of. In simple terms it may be said, that while everything has been done to increase the range of the fowling-piece, little has been done to give the elevation necessary to take full advantage of the increase of power. The greater thickness of the barrels at the breech has been of some use, but as long as the one-eye style of shooting is adopted, the object will most probably be struck only by outside weak pellets, and not by the effective central shot. The very great difference in power of the central and outer pellets can only be known to men who, like the author, have to make it their business to master these details, and who have to combat and overcome the various peculiarities, in quality of iron and other matters, which make the comparative shooting powers of some guns a mystery to the most experienced. The farther off the object is, there is the greater difficulty in commanding its motions with the eye; and to shut the left eye and lower the other to the level of the breech, with the "sight" at the muzzle intervening, is a very likely means to lose sight of the object altogether. The proper way is to throw the gun

well up and into the shoulder; the setting-off of the stock will then bring the barrels right in front of the face; and, the head being erect and both eyes fixed intently on the object, the line of motion is commanded, and the aim taken instinctively in advance if crossing, or above if going right out. The central pellets have thus an allowance given them to compensate for distance and the motion of the object. Within what may be termed the short range, say up to 40 yards, the outer pellets have, when fired from a gun of average power, strength enough to bring down a hare or bird. Here those who deny the truth of the longer range completely mystify themselves. They argue thus—If a gun shoot well at 70 yards, it must cut game to pieces at 30 yards, and how can it shoot correctly as to elevation at both distances? It has already been shown, that the farther the distance an object is looked at, the muzzle bearing upon it, the higher will it be in perspective, just as a level distance in a painting rises higher on the canvas. Keeping both eyes open and fixed on the object aimed at, you look along an imaginary line, higher at the breech according to distance, and at this elevation the gun is fired, exactly as a rifle target-shooter sets his breech-sight to a given distance. Consequently, as his rifle will shoot true to any distance within its range, the breech-sight being set accordingly, so will the fowling-piece throw up its centre pellets to the object of aim as long as it is within effective range, your line of vision, high at the breech, forming the true elevation. These central pellets are to the smooth bore what the single bullet is to the rifle; and by their aim and power,

and not by the weak outsiders, the question of range must be judged. As to cutting game to pieces with a hard-shooting gun at short distances, the fact is that a good gun disperses its shot so regularly, that at 30 yards the number of pellets which will strike a grouse, partridge, or hare, will not cut it to pieces, as it is termed. It is your close-shooting gun, made for a deceptive display on a white-washed target, that cuts up and destroys game at short ranges. It is a great pity that sportsmen are too much inclined to judge a gun's merits by close shooting alone. The closest target gun is not always the best *general* game gun.[2] True, the gunsmith must use target shooting to regulate his gun, but, if he know his business thoroughly, he will not be slavishly tied down by the number of pellets without higher considerations. It is an error to suppose that a gun to kill at 70 yards must shoot very close. Practically this is not the case. A good gun discharges its shot regularly, neither too closely nor too widely. And,

[2] In this objection to over-close and weak-shooting guns, I do not include those made purposely for killing ducks flying over-head, or wild game of any kind. The above remarks refer to general game-shooting, as practised in Great Britain. The guns bored on the "new system" have introduced an era in the history of sporting fire-arms. In these the charges of shot can be reduced in the most remarkable,—I might say mysterious,—manner, so that the game is not cut up, while the range is prolonged. It is also an advantage in these new guns that, by varying the proportions of the ammunition, they can be made to shoot either in the old style or the new. It would just be as wrong to use the new style for rabbits or woodcock in coverts—to take extreme cases—as the old for high-flying ducks in the open. It will be enough for the gunsmith who knows his business, to be instructed in the sportsman's requirements.

what may be particularly noticed is, that while he outer pellets increase their divergence from the same cause, whatever that may have been, which first made them to diverge at all, there remain in the centre a sufficient number, which have received a direct impetus, to hit and bring down game at the long range, provided allowance be made for the distance they have to travel. Let any one stand near a target and mark the difference of time that small shot takes to come up from 40 and from 80 yards, and he will perceive that a bird or hare going at speed has had time to escape, unless the gun keeps with its motion and is fired in advance. This can only be effectively done with both eyes open, the gun being suited in shape to the figure, and the finger instinctively drawing the trigger at the proper moment. Why this is not so particularly required at short range is, that up to 40 yards the rib and thickness of barrel at the breech give elevation enough, while the spread of the shot, all strong enough at short distances, compensates the momentary loss of sight of the object, which must occur at the moment of firing if the left eye be shut and the right be brought down level with the rib. Finding in practice that this system kills well enough at short ranges, the one-eye men—who rarely fire at an object above 40 yards, and when they do, must, except by accident, shoot under or behind it—come to disbelieve altogether in a mode of shooting which nearly doubles the power of the gun and the capability of the sportsman. I may be repeating myself here, but the question is of the first importance, and reiteration teaches. It may not be out

of place for me to state that in the year 1856 I accepted a public challenge to kill hares running broad-side at 70 yards, but after I had accepted, the challenger, who had denied the possibility, backed out.

If you wish to preserve one sex of your hares more than the other for any reasons, do not fire at any you have not first found in its form. You may then readily distinguish the sex; the buck keeping his ears firm and close to the head: the doe lies with her ears open and distended.

GROUSE SHOOTING

Is, *par excellence*, the finest field sport known in connexion with shooting. Woodcock shooting has peculiar zest for experienced and quick shots, but the pursuit of grouse, carried on in the pure air of mountainous and heathy tracts, with all the concomitants of highly ranging dogs, open views, and frequently magnificent scenery, is quite unequalled on the whole by any other shooting whatsoever. It is quite unknown out of the British Islands, the red grouse, *Lagopus Scoticus*, only existing therein. Curiously, it is really not a "grouse" at all, but what may be termed a low country "ptarmigan," just as there are low country brown hares and mountain white ones. But, in common parlance, grouse it is and grouse it will remain.

There can hardly be a greater proof of the national

fondness for field sports than the importance which is attached to the TWELFTH OF AUGUST—the opening day of grouse shooting in Great Britain, and now also in Ireland. The birds have been watched by thousands of persons, through all the incidents of the pairing, hatching, and rearing seasons, and the interest has now reached the climax. It is not too much to say, that the pursuit of this beautiful and gallant bird moves the very mainsprings of a great part of the higher branches of society, while to many other individuals its comparative plenty or scarcity is a matter of grave concern. During the whole spring and summer there is a stream of sportsmen setting into the North in quest of shooting quarters; towards the end of July this stream becomes a torrent—and it has even been whispered that Parliament itself is not unaffected by the strength of the current. About this time a hurrying on of the legislation, and that postponing to a future session or indiscriminate throwing out altogether of numerous bills, which has been aptly termed "the slaughter of the innocents," come round regularly with the season; and however grave the state of public matters may chance to be, somehow or other the sport of grouse shooting seems paramount to all questions. Of course, no hint of such a thing is ever given in the "Houses of Parliament assembled," but the fact remains the same nevertheless.

In our northern cities, for some weeks previously to the Twelfth, countless pointers and setters may be seen being led about the public streets and in the neighbourhood of the shops of gunsmiths, who brighten up wonder-

fully about this season. Most of these dogs are curs of particularly low degree, if indeed it be possible to invest them with any right and title to what may be called a "degree" at all. Certainly many of them have not studied their profession under a breaker, even if their pedigree were such as to entitle them to enter themselves as candidates for canine honours. Yet it is a remarkable fact, worthy of grave considerations by psychological students, that the sellers of these dogs are never known to be aware of their having a single fault, but, on the contrary, declare them to possess every good quality which can endear them to the heart (and the pocket) of the young and ardent sportsman. If, for instance, the young aspirant wish a retrieving pointer, so fondly beloved by French *chasseurs*, and ask one of these peripatetic merchants, with all the knowingness and affectation of sporting phraseology he can assume, "Does that dog carry his game?" he will receive a favourable answer, but the vendor will not tell him that the birds will be eaten first.

It may also be a subject of curious inquiry why it always does happen, that about the first of August, old gentlemen, who have avowed all the summer that they will not shoot this season, suddenly become sanguine and declare that they will. And, *per contra*, how it possibly can occur, by a regular concomitance of circumstances, that young gentlemen, who for weeks have donned shooting-coats and laced boots, and have canvassed the state of the birds in every company, suddenly discover that they are called away on business, or that, owing to a thousand-

and-one unforeseen causes, they will not "get away on the Twelfth, but may possibly turn out about the first of September."

By the tenth of the month, or even earlier, poachers are at work on the outlying grounds; and it has never yet but so happened, that poulterers, by noon on the Twelfth, have just received, by some remarkable opportunity, one box only (?), of grouse, warranted not to have been killed before that very morning; while it will go hard, indeed, but that you find "grouse" on the "cartes" of the principal restaurateurs.

It has been attempted to make an approximation to the annual value of grouse shootings in Scotland; and a popular periodical some thirty years ago set down the rents alone as at least £70,000. But this sum is now, 1875, immensely under the mark, while the money brought into and expended in the country by sportsmen and their families, must, in the aggregate, be so large as to invest the sport with quite a national interest. Many grouse shootings are let at from £300 to £1000 per annum. Add to this the very great contingent expenses for keepers, watchers, bag-carriers, carriage of game, etc., etc.; and let it be observed that a large amount of this expenditure is by strangers who, without this attraction, would not visit Scotland at all. These large sums are annually brought into the country, not in payment of exported produce, but of rents and services. In point of fact there is an annual introduction of new capital, the profits or accumulations of other countries, which is carried in a golden stream into the most remote Highland

valleys, and all this occurs, without affecting, in any appreciable degree, the pursuits of cattle-rearing or agriculture. It is, therefore, not without some reason that the proprietors of grouse shootings now pay attention to this source of income. But it is a matter which cannot be concealed, that the avidity with which everything possessing the name of a "shooting" is taken by English gentlemen, has caused many places to be let as such, and as being "strictly preserved," where no heather is known to bloom, and whose nearest approach to a keeper is the shepherd.

Grouse shootings are now a recognized element in the value of Highland estates; and what sportsmen have to complain of in many cases is, that while high rents are charged for such shootings, there is a looseness in the management of the ground when not let, as well as in the general character given to the ground, which would not be tolerated in any other pecuniary transaction where a full *quid pro quo* is expected and given. No proprietor, for instance, would allow an unlet farm to return to a state of nature; yet in the matter of shootings there seems to be a very frequent disregard of proper trapping and preserving, so that, on entrance, the tenant has to begin anew to raise a stock of game upon what may be termed the raw material, while the rent is far from being proportionally low. These remarks, are, it is to be hoped, not out of place here, and are worthy the attention of landowners, who have merely to adopt the same management of shootings which they use in other matters to enhance the value of their estates.

The author writes guardedly, and from considerable experience on the subject; and were he inclined, or were this the proper place for such expression of his opinion, he could make not a few remarks which would tend to prove that the system now carried on—not universally, yet still too frequently—has begun to have the effect of deterring many sportsmen from taking the risk of a Highland "moor." The remedy is simple. Stop all poaching, trap the ground duly, and, in general, let there be the same consideration given to the interests of the prospective tenants as would be in letting farms; but do not treat the question of the stock of game as a mere sporting matter, and yet charge for the shootings a solid and substantial rent, which is no matter of sport at all. Since this passage was first published very general improvements have been made.

It frequently happens, too, that there is a very great disregard for the interests of tenants of the shootings, as secondary to those of the farmers, whenever the driving of cattle and gathering of sheep are concerned. Now, although as a question of social economy the farmer's interests are superior to the sportsman's, yet when there is a mutual agreement and a full rent paid, the sportsman has as undoubted a right to be protected from all unnecessary annoyance in the prosecution of his sport as the farmer has in the rearing of his cattle. The general reader—who may be disposed to view this question in that utilitarian spirit which seems to reduce every subject to a pecuniary standard, and forgets that there are such things as health and recreation required even to fit man-

kind for the pursuit of wealth—is reminded that grouse-moors are here treated of, not the over-preservation of game on arable land. The preservation of grouse, and the business of the sheep or cattle farmer, may be carried on in perfect consistence with due justice to both interests. It often seemed to me, and probably others have had similar experience, that the shepherds appeared to drive their flocks about unnecessarily or capriciously, to the great annoyance of the sportsmen.

That these remarks are not uncalled for, one anecdote only out of numerous others may be here recorded. The author advertised for many consecutive weeks, in a well-known newspaper, for good grouse-shootings, and having formed quite a collection of replies, all more or less highly laudatory of the excellence of the various shootings, the gentleman who wished to become the lessee started on a tour of inspection. Not one of the letters conveyed a just description of the respective shootings. Preservation or trapping was generally unknown. On one estate not a head of grouse was known to exist, and on the proprietor being asked why he could possibly recommend his place as likely to suit the advertiser, he coolly replied, "Oh, there's capital otter-shooting along the shore here!" The gentleman on his tour luckily hit upon a shooting of 30,000 acres which had never been in the market or let before at all. Once for all, let no grouse-shooting be taken without inspection, or a reference being made to the previous tenant. Many proprietors are themselves ignorant of the state of their game. In other cases the question has not been properly viewed, or has been

treated as a trifling and unimportant consideration. Because the shootings are let for exercise and recreation, the proprietor may not attach the same importance to the state of the game as he would if drawing the rent for farming purposes. By-and-by, if they continue in the same demand, shootings will be regularly treated like other articles of property, and will not be let as simply containing so many thousand acres, but rather according to how these acres have been fitted for letting by proper management.

The young sportsman—having surmounted all the difficulties of inexperience, and having arrived a few days before the twelfth at his shooting quarters—should devote the interim to acquiring a knowledge of his ground, its water-courses, places where the grouse love best to feed and bask, and such other information as the keeper or watchers can give, which will much enhance the pleasure of his sport, and give him a fair start. If he has never shot grouse before, let him bear in mind that he is about to enter upon an exertion of strength beyond anything he is likely to have experienced. Grouse-shooting is about the hardest work possible, and were it not for that indomitable love of the chase in some particular form or other, from angling to elephant-shooting, which is inherent in human nature, few men, unless of the most robust constitution, would attempt its pursuit at all. The reflected heat in a Highland heathery glen is something tropical in character, with an amount of anything but tropical exertion. Regular and gradually increasing exercise should, therefore, be taken, and early hours kept.

Let temperance be the unfailing rule, and under the influence of the bracing air and regulated fatigue the young sportsman will acquire a due capability of following his game from "morn till dewy eve" on the twelfth, and make a bag accordingly. On that all-eventful morning let him breakfast at seven o'clock, rest for an hour or even more, find himself slowly approaching his ground about nine, and about ten o'clock let him begin thoroughly to enter upon his work. Shooting steadily until two, about which time the grouse feed, let him rest an hour and lunch upon biscuit and cold tea; then over old and cautious dogs let him shoot on until evening, never hurrying or getting excited, and he may rely upon returning to his quarters with a bag far outnumbering that of the impatient sportsman, who starts while the dew is yet on the heather, knocks the birds about before they have fed, thus unsettling them for the whole day, and who tires himself out by his morning's exertions, losing thereby the very best period of the day —the afternoon.

In hunting a grouse-moor, it is proper to take such a course (working against the wind) as will drive the birds to a central and, if possible, less elevated position. Indeed grouse, when disturbed, generally go down hill, but it should be the aim to drive them inwards from the marches, and to break up the coveys, so as to make the single birds certain to sit close and afford good points. This gives the superiority of the afternoon, when the ground should be slowly hunted with the utmost care and deliberation, otherwise very many close-sitting single

birds will be passed over. The scent differs very much on different days, and sometimes the best dogs will be puzzled with birds sitting like stones under their very noses. When the heather is shedding its bloom, which may be known by it adhering to the boot of the sportsman, there may be said to be no scent at all, or else the bloom gets into the nostrils of the dogs and renders them useless. On such days all that can be done is to move about very slowly and hunt up every corner.

Should the strength and nerve of the young sportsman fail him after the first exertion, let him at once lie down on his back upon a clump of dry heather, taking proper precautions to avoid catching cold. The climbing a steep ascent has a peculiar effect upon the nerves, making many a good shot miss every bird he fires at: to follow up the game while in this state is a needless waste of time and ammunition. How common is the remark, "I had only a few birds at lunch-time, having gone off my shooting, but missed nothing in the afternoon." When, therefore, the birds are missed without any apparent cause, let the shooter lie down for half an hour, and not grudge the time so spent. There is no peculiarity in the flight of grouse which calls for any specific advice in taking aim. It is almost superfluous to say that of course one bird should be singled out at each discharge; but "the brown of them" is very seductive to a tyro anxious to make a bag, a miss being sure to follow. In general, especially at the beginning of the season and in dry weather, they are easily brought down; but there is no shot more trying than an old cock in a high wind.

He has such a knack of rising rapidly, and again as it were throwing himself on the heather, all the time going off like a whirlwind, that it takes the very quickest eyes to follow and cover his movements. No young sportsman need therefore vex himself at missing such a bird, which certainly is of all shots the most difficult. Very young birds, called "cheepers," from the cry they make when taking wing, are, on the other hand, beneath notice, and should never be fired at. Anxious, however, to "make a bag" in print, too many of these short-lived wretches fall beneath the sportsman's aim on the twelfth. Unless the birds are particularly well-sized and strong upon the wing, No. 6 will be found the best size of shot. Towards the end of the season No. 4 will be found to bring them down, when No. 6 will have no effect beyond driving out a few feathers. As mentioned in a former chapter, the use of larger shot than No. 4 for grouse should not be tolerated, as it only wounds many birds, and produces, by being lodged under the skin, suppurative sores, causing a lingering death. When it is of importance to the shooter that he should feel no jar whatever from the gun, through nervous excitability or any organic disease, let him by all means use No. 7 shot, charging with only $\frac{3}{4}$ or $\frac{7}{8}$ oz., and $2\frac{3}{4}$ or 3 drams of powder. During all August this size of shot will be found sufficiently deadly. The same advice may be extended to partridge-shooting in September.

If a covey of grouse rise simultaneously, the inexperienced sportsman is apt to be flurried by the noise of their wings, which is somewhat startling from its

suddenness, and consequently to fire rashly into the middle of the lot, or, as it is termed, into "the brown of them," when he is pretty sure to miss altogether. The trigger should never be drawn until one bird is singled out and covered; and every exertion ought to be made to acquire the capability of doing this without the slightest abstraction of the attention from it to the other birds. It is somewhat difficult for the young sportsman to do this, because he naturally thinks that it must be better to fire at a number of birds than at only one, but experience will teach him that it is by fixing his eye on one bird and allowing the others to go that he will make sure of bagging any at all, and especially of getting right and left shots. Meantime the keeper and markers are watching the flight of the birds, and "marking them in;" that is, making out the exact spot where they alight. It is wonderful how far a good marker will follow the flight of birds upon the wing with the naked eye, and there is also some art in the matter. Keep your eye upon the line of flight after you have lost sight of the birds, and if they alight within eyesight, you will likely catch a glimpse of them from the manner in which they flutter their wings in doing so. Birds so marked should always be followed up, as it is a rule in shooting, that where a bird is known to be it should be searched for until found, as it both saves time and gives the dogs confidence in the superior knowledge of their masters. Small telescopes are sometimes used in marking grouse, but persons accustomed to the practice can do all that is required without the aid of mechanical

optics, while the shooter himself has really other things to attend to than following the flight of birds (if he could) through a small field telescope. As a general rule, all such gimcracks and appliances are best let alone, notwithstanding the endless puffs and advertisements contained in newspapers of this, that, and t'other new invention being quite "indispensable" to the sportsman.

As the season advances grouse become wild, and must be approached with caution. The ground should always be carefully hunted, as possibly some birds which may have received a slight wound will now sit until you actually tramp them up. These birds may be generally known by their sitting so closely and being always found singly. Take advantage of every inequality to conceal your approach, and you will probably get some shots by coming suddenly on birds sitting behind knolls and in moss-hags. On a continuance of wet weather, grouse in the Highlands—and with any weather early in September on the Lowland moors—congregate in large flocks called "packs." The term "pack" is wrongly used by many writers to denote a single brood; but a brood of grouse is properly a "covey," and a "pack" is a number of broods gathered into a large flock. These packs separate again during fine weather in mountainous districts, but rarely if ever do so south of the Forth. Like all other wild animals congregated in large numbers, grouse in packs are very wary, vigilant, and difficult of approach; and the only chance of getting a shot is by "driving" them, that is,

sending a man round to disturb them, the sportsman being placed in concealment on their probable line of flight.[3] The rapidity of their motion is so great that quick work is required, the aim being taken a full foot in advance of the bird, and, above all, the gun not being fired until the bird is abreast of the shooter; for to hit an advancing grouse is almost an impossibility. If the shooter have the coolness and nerve to keep himself concealed until the birds are just about to fly over him, and rise suddenly at the critical moment, their direct flight will be broken and their velocity lessened by the slight divergence and ascent they are sure to make, and a better shot will be afforded. But the whole thing passes so rapidly, that to one inexperienced the chance of hitting driven grouse is small indeed. On low country moors, after the grouse

[3] This grouse-driving has of late years become quite a branch of high art in shooting, and its merits and demerits have produced much discussion. Some hoped that by thinning the birds it would prevent "disease," and also that as the old cocks—notoriously "vermin"—lead the flights, and so can be readily shot down, much general advantage would be gained by this mode of shooting. Others denounced it as effeminate and over-destructive. Effeminate it certainly is not. The sportsmen must take one position after another with rapidity, and make their way with great exertion from place to place. As to destructiveness, there may be occasionally extraordinary bags made—as those on the Yorkshire moors by Mr. Frederick Milbank, who, in a few days in one season, killed something like one and a half tons of grouse (taking each bird at twenty ounces)—but it is the nature of grouse to become more and more wary as they are pursued, and we need have no fear of extermination, or even of permanent reduction of the whole stock, through hard shooting. Disease through overstocking will kill its thousands, where the gun kills its hundreds, let the sportsman be as keen as he pleases.

have once become wild and packed, there is little probability of sport during the remainder of the season, which closes on the 10th of December, unless during a hard—what is called in Scotland a "black"—frost, when grouse sit and bask on the sunny side of peat-hags. A dog is useless or worse on such occasions; and shots are only to be obtained by quietly slipping about among the deep hags. The bag is not likely to be a large one, but the birds are now all full-grown and plump, and somehow or other, in both shooting and fishing, the pleasure seems to be equally great with moderate as with immoderate panniers. The whole seems a question of comparison. If you expect to kill 50 brace and kill only 40, you are disappointed—whereas 15 to 20 brace may exceed your expectations, and give more zest to your sport than the bagging of three times the number.

As an instance of the uncertainty of all rules as to grouse sitting well, I may mention the following. Shooting on the afternoon of the 3rd November, 1857, on Mr. Callander of Ardkinglas' beautiful moor of Ardchylline, on Lochfyneside, which I then rented, after devoting the previous part of the day to the pursuit of black-game in the coverts, I went up to the open moor from mere curiosity, not expecting any red-grouse to sit, it having rained heavily for the six previous days. To my surprise the grouse sat like stones, and although it was too late in the day to make a large bag, I made a considerable one, no bird rising until fairly walked up from before the dog's nose, so that I killed at every shot. A sudden and sharp frost set in that night.

When the wind is blowing strongly off your ground never hunt near to your leeward marches, as you will drive your birds off your own ground. At once make towards the direction from which the wind blows. On the other hand, when the wind blows strongly on to your ground from lands where shooting is actually going on, do not hunt near to your windward marches on that day —on the next you may have excellent sport. A sharp critic came down upon this passage as being in effect preventive of shooting at all with strong wind blowing. This shows how guardedly every line of this little book must be written. I thought my meaning clear enough, viz.: to keep well in the centre of your ground, so as neither to drive your own birds off, nor deter others from coming on. I only wish all other books on shooting were as carefully written "by the card." Sharp criticism, however, does much good in the end, so I bow and become explanatory. When birds sit well, if you are a good shot you may make a circuit when the dogs point, and approach them from the other side of the covey. Both grouse and partridges are more readily separated in this way, but go off more irregularly, and are not so easily killed. It is the favourite mode, however, with many experienced sportsmen, and partridges especially are more likely to separate when so approached, and also to rise singly, as they sit watching the dogs; but they also fly off more swiftly, and in uncertain directions.

Young grouse (and this will serve for partridges and other hard-billed birds) may be known from the old by suspending them by the lower mandible of the bill, which

in a young bird will bend and give way, but not in an old.

All game should be thoroughly cooled before being packed. This applies especially to grouse, which are mostly killed in the hot season. When a grouse or partridge is lifted, however anxious the man may be to put it into the bag or basket, he must be made to carry it in his hand until cold. On large and thickly-birded moors this may be hardly practicable, and game-panniers, well-ventilated, are used; but nothing will make up for the hand-carrying, by which grouse will keep fresh for many days longer. Never trust to any "grouse-sticks," loops to game-bags, or other such apparatus, from which birds are very often lost.

To preserve game for travelling, place them, if held overnight, in the coolest place possible, but particularly in a dry place; the best way is to suspend them on a line. Put a peppercorn down the gullet, and dust the vent with pepper when being packed. There is a new system broached, very likely to be a good one—the use of coffee, a well-known disinfectant, to be used freely in packing grouse. This holds out a really simple plan, and is quite consistent with the general known properties of coffee.

GROUSE DISEASE.

It is not the object of this work to give any description of the natural history of game, yet a few words

may be expected on the mysterious diseases of grouse, the more especially as for nigh twenty years I have been a frequent writer on the subject in the public press. For a great part of that period I have advocated the theory that "disease" is originally artificially produced by overstocking. It is only within these four or five years that my opinions, for a long time treated as unfounded and even fanciful, have been generally adopted by naturalists. "Everything comes to him who knows how to wait."

Although placed by my profession in a position making such subjects a frequent topic of conversation with intelligent sportsmen, yet I must frankly confess that for a long time I was unable to explain the origin of these epizootic diseases. Besides the opportunities of acquiring information, having from early and general studies a strong bias to the elucidation of all questions connected with physiology, I was yet perfectly unable to reconcile the conflicting opinions of sportsmen upon this matter. Grouse are found in some years dead and dying in hundreds—leaving scarcely a breeding stock upon the ground. On the same moors the black-game remain quite healthy. The feeding during autumn upon wet swollen corn off the stooks, which both regularly do, cannot be the sole cause, as once thought by many. Grouse feed principally on the fragrant young heath-tops; and it has frequently been asserted that any blight of the heather is followed by disease; but, *per contra*, that diseased grouse have been found with their crops full of healthy heath-tops: it is only fair to state this, but it does not vitiate the broader arguments. There is a grass, *Juncus Squarrosus*,

whose seeds are alleged to be required to maintain red-grouse in health; and this grass not being perhaps over plentiful at any time, and being subject to blights, may be an important element in the whole question. Disease may arise from the birds not having a proper admixture of food, as well as from deficiency, and thus be produced not only semi-starvation, but also tapeworm and disease of the liver. Why should a scarcity of food alone produce tapeworm and diseased liver? and why should such an over-abundance of grouse as existed on the Ayrshire moors in 1853 be followed by the scarcity of 1854? Either black-game are naturally of a more robust constitution, and more adapted for our climate, by living healthily on a greater variety of food, which keeps them free from the epizootic diseases to which grouse are subject, or there is some cause yet unknown which periodically devastates the latter, and blasts the hopes of the sportsman. It appeared that grouse did not become diseased by seeking unusual food, but that they sought unusual food in consequence of disease. So it was formerly supposed; but greater experience modifies that sentence into this:—Grouse become diseased through, under the loss of some proper kinds of food, eating improper food. Thus they may be seen to leave their usual haunts and feed on the common haws on hedge-rows, and even to descend to the sea-shore and feed among the sea-ware; but as far as was once judged, the disease existed before the migration. The questions were raised, Is there anything in the isolation of the British breed of grouse by which the usual effects of breeding in-an-in are produced? Are the birds too

numerous, so as to render the ground foul and unwholesome ? or is the mode of shooting such as to kill off the best breeding birds? And in particular, might not an infusion of fresh blood—by introducing the varieties which exist in the mountains of France, Spain, Italy, and other countries—have a beneficial effect? Although differing in some respects, there is a strong opinion, amounting with some naturalists to a certainty, that these foreigners would breed with our grouse; this I gravely doubt, still we have only to look at our domestic poultry to see the benefit of crosses with Cochin-china and other varieties, certainly not more like in outward appearance to our barn-yard fowls than foreign are to British grouse. Meanwhile it seemed an impossibility to arrive at the real cause of the disease. No sooner was the mind satisfied with one explanation, than facts equally credible upset the previous arguments, or were incapable of being reconciled with them. The pecuniary value of grouse moors to this country was too great to allow the question to be treated with indifference. Many of the arguments were fantastical; some of the cleverest at first sight were not improbably ironical, although given with an affectation of great gravity. The theory of improvement by cross-breeding with foreign birds gradually became less freely asserted. In 1857 I wrote these words:—"The disease may be an effort of nature to re-establish a just balance where the birds are too numerous. If the gun has not killed what would have fallen to the vermin (trapped off), over-stocking and disease follow. Moors well shot over are always the most healthy, but if wet weather sets in

the gun cannot do its work through the wildness of the birds."

As time went on I began to see that, however plausible might be one or other of the arguments, disease never set in except after over-abundance, and by dint of investigation I arrived by fair induction at the conclusion, that, the whole mischief arose, primarily, from over-stocking, and, secondarily, from gamekeepers most improperly killing off the falcons. These I termed the "sanitary commissioners," because they kill off the weaker birds, and much was I twitted by ignorant writers for presuming to declare that the noble falcon would content herself with any but the plumpest bird of the pack. It is a wise law, governing all predatory animals, to take the weakest as prey. The first historical reference I have been able to find to grouse disease is in a letter from Sir Walter Scott at Abbotsford, to his son with his regiment at Cork. "August 1, 1819:—I hear of a disease among the moor fowl. I suppose they are dying for grief at your departure." It is clear that the malady was "a" new thing. The phraseology plainly bears no other interpretation. Sir Walter "hears of *a* disease," not *the* disease; and he jocularly suggests a reason for so unwonted a visitation. About the years 1833-5, my late friend, Mr. John Crooks, acting on behalf of the lessee of a large tract of moors in Argyleshire, to whom money was no consideration, by suddenly employing an unusually large number of keepers trapped the vermin nearly to extermination. Then set in, on that ground, perhaps the first sweeping case of disease yet known, so that the

whole establishment was broken up, and a sum of money paid to the landlord to cancel the lease—that very lease, in the concluding years of which, under the influence of relentless trapping, an inexhaustible stock of grouse was anticipated.

I have personally ascertained by inquiry among the more aged Highlanders and gentlemen resident in the North of England, that "disease" was in their early days quite unknown. On one occasion an old lady, who had a sheep farm in Argyleshire, became bitterly eloquent on the subject, and assured me, with all Highland fervour, that the disease was "a curse of God Almighty on the grouse, because now-a-days the lairds let the moors to Sassenach (English) gentlemen." This was an admirable instance of an indirect result of human management being taken for direct Divine punishment of what was only a fault in the speaker's estimation, or rather imagination. The lady was honest, earnestly and reverently believing in all she asserted; but the supposed curse fell on the poor grouse, and not on the lairds.

Some very weak arguments have been advanced against the overstocking theory, such as that the disease affects the grouse on moors where the stock is moderate. This is not at all improbable. Disease is never expected to terminate where it is engendered.[4] Fever will spread

[4] Diseased grouse become emaciated—the plumage darkens in colour—a burning thirst causes the birds to linger at the small water-courses, which they pollute by their morbific droppings. Healthy birds drinking from the same rills are in all probability thus affected. Tapeworm is sometimes a concomitant of the disease, but the liver is the organ most seriously affected, inflaming and becoming quite

from crowded lanes to palatial squares. The plague and cholera-morbus have their places of birth, and thence run half round the globe. But we have the facts, that grouse disease never widely affects the birds save after a year or more of great plentifulness; that if it sweeps over one part of the country this year, that part will be very little affected if at all the next; and that, after wide-spread havoc, as in 1874, a period of health sets in. So regular are these alternations according to circumstances, that I have correctly predicted in print the very years when we might next look for serious disease. Besides, all analogy, as for instance in the overstocking of cattle on a given space of ground, or of hares within enclosures, as by the late Lord Glasgow in Renfrewshire, shows that Nature resents and punishes any attempt to upset the laws governing the amount of life she is able to support.

As I have been charged with fancifulness on the one hand, and dogmatism on the other, I think it only just to myself and those who agree with me on this important question, to give the following mode of reasoning:—All axioms in natural philosophy are proved by induction. A great many particular facts being proved and found to be universal, by the inductive process of reasoning, a law is discovered and established. We may be quite ignorant of the primary causes at work, but we are bound by the proofs; and it also follows, and is the admitted rule in all

brittle and disorganized. This sometimes goes on so rapidly as to be fatal in a few hours. The author believes that there may be some stoppage of the general secretions, as he has found the crop full of perfectly dry birch leaves.

discussion, that after a general truth is thus established, the reasoning may be extended from the whole to a part. Thus: it is a constituted fact that the overcrowding of any animals, not excluding mankind, in a space smaller than Nature has appointed, is followed by disease. We cannot exactly define the required extent of that space as applicable to different classes of animals; but as we find that no class escapes this effect, the aggregate of so many separate instances establishes the fact of the general law, that overcrowding creates disease. All the minor details and differences, as to food, &c., disappear before this great principle, and we are entitled to extend the application to all conditions or circumstances coming fairly within the scope of the argument. Now, as it is undeniable that the crowding of, let us say hares, sheep, poultry, and other animals, constitutes a diseased state, so we are entitled to extend the law to grouse, quite irrespectively of our want of ability to define the exact bounds or conditions conducive to a healthy state. It being equally undeniable that what is termed preserving artificially creates an over-abundance of grouse, and that the predatory animals which would have kept down the stock (more especially killing off the weaker birds, thus also keeping up the vigour of the race as affecting breeding), and maintained the balance of animated nature have been destroyed by the "preservers," we are justly entitled to attribute "disease" to this artificial over-abundance. This is not dogmatism, but pure induction and deduction—the most opposed of all reasoning processes to dogmatism.

So far, my case is quite good; but let us submit it to a crucial test. Let us inquire if "disease" was ever heard of previously to this artificial increase; and, above all, let us submit the argument to the still more rigorous inquiry —Has "disease" been known to primarily attack grouse except when over-abundant? or where "trapping" of vermin is not exercised, as in deer forests? Now, as there is but one answer to these questions, and that in the negative, my assertion that overcrowding creates disease is as thoroughly established as the laws by which eclipses may be calculated and their exact period foretold. All discursive verbiage, in opposition to such facts, is mere rhetorical shrieking, and has no weight with men of sense and reasoning faculties. The pity is that such illogical writers fancy that they are arguing when they are merely declaiming. I cannot calculate the return of grouse disease with the exactness of astronomers regarding eclipses, but I can predict that it will return so soon as an undue stock of grouse has been left on the ground at the close of the shooting season and the next spring be other than extremely mild—perhaps even although extremely mild.

Supposing that foreign *Tetraones* are so distinct from the subgenus *Lagopus Scoticus* as not to breed with the latter, may it not be better to have on our moors a greater variety of game, so that the same extent of country might easily supply with food an equal number of birds, without periodical starvation? This would arise from the diversity of food used by the various breeds, while at present one breed only is highly pre-

served, and, when it fails, all is lost except the much less-prized black-game. Pasture for instance is known to support a greater amount of animal life when fed upon by oxen and sheep, or oxen and horses, than by one kind alone. May it not be worthy of the attention of our landowners to follow up the same rule in stocking their moors? The North American continent possesses many varieties of grouse, and some of these seem adapted for this country—in particular, *Tetrao Richardsonii*, *Tetrao Urophasianellus*, *Tetrao Sabini*, and *Tetrao Franklinii*. All these would undoubtedly breed in this climate, while their food seems equally certain to consist of plants abounding in the Highlands.

This important question may naturally strike the reader:—If grouse shooting be so valuable, why should not, when the stock is abundant, the birds be artificially fed, say as pheasants? The difficulty arises from the remarkable fact, that red-grouse rarely, if ever, pick up food from the ground. If this law of their nature be absolute, then there is an end to the question, yet it might be worthy the while of some experimentalist, with leisure and opportunities, to fairly test it. I may hint, that, if any man can invent a mode of artificially feeding red-grouse, and can protect his invention by letters patent, he will achieve a fortune.

Attempts are being made to introduce the Scottish red-grouse into New Zealand. In the autumn of 1873 my eldest son had the pleasure of superintending the despatch of a number to these splendid islands, where the abundance of rushes and grass seeds may provide an ample

supply of food. Black-game, however, to which heather seems not indispensable, would probably suit better. I have frequently expressed surprize that no one tries to introduce grouse into Belgium. There is ample space and verge enough for the experiment near to Spa, and the worthy burgomasters of that ancient sanatorium, now that they have not the meretricious attractions of the gaming saloons, might profitably take the hint. Black-game are there already; but just as there is too much trapping with us, around Spa there is too little, although the town maintains a number of gamekeepers, to whom the enabling the sportsman to shoot a fox is, I sadly fear, the greatest of all aspirations. It may be worthy of notice, *en passant*, that sportsmen ambitious of killing a wild boar, have a fair chance of doing so near Spa in the closing months of the year.

BLACK-GAME SHOOTING

COMMENCES upon the twentieth of August, although many of this large breed of grouse, *Tetrao Tetrix* (a much better, as more descriptive, title is that adopted by Swainson, *Lyrurus Tetrix*), fall in mistake for their red congeners before that day arrives. At the very beginning of the season the mode of shooting black-game differs in little from grouse-shooting, but they are to be looked for in soft, swampy, and rushy ground. The "grey-hen" is much smaller than the male bird, is of mottled colour,

brown and grey, so widely different from the splendid blueish-black lustre of the former, and approaches nearly to the habits of the domestic fowl in the rearing of her flock. On being hatched, she leads her brood to some little meadow, such as may often be seen on Highland moors, where a rivulet flows, and which abounds with rushes and long waving grass, the seeds of which constitute their principal food. Her object is to conceal the nest and brood from the male birds, which are polygamous, and are said to destroy the eggs. This is doubtful, however, for as the season advances, the male birds, after a period of high courage and daily combating,[5] become shy and timid, and retire to thick

[5] These combats are peculiarly interesting to naturalists, and, from being waged in solitary retreats, and at the dawn of day, are seldom witnessed. At one time I made much inquiry into this subject, on which I see even the great Mr. Darwin is expressing a desire for information. This, at one time, I could have afforded him in detail, but I have only now a general recollection. I also forget the specific name the Highlanders give to the gatherings. The following is a general account:—At the return of the breeding season in April, black-grouse assemble at dawn in such localities as afford a piece of level ground suitable for the ensuing contests, but with higher places all around on which the hens can take up their position as spectators. A cock—all bristling in pride and glowing with ardour—enters the arena; to him enters another, equally animated. A combat ensues. The defeated bird retires in discomfiture and disgrace, while the victor struts all around more proudly than ever. Here—the country people assert—the hens all make reverence to him, by a series of most regular and courteously profound bows. Another aspirant now comes upon the scene, with another combat, and so on, until one bird is indubitably the master, and remains lord paramount for the day. "None but the brave deserves the fair." Black-game are peculiarly hardy and free from diseases. May this not partly arise from the male progenitors being always the most vigorous of the whole flock?

underwood or fern coverts to moult, and I have seldom seen more miserable objects than the lately gay and gallant cocks are at this time. At all events, the mother alone performs all the duties of incubation and rearing, laying from six to eight eggs, and leading about her brood with unceasing care—the male birds associating through the summer in small flocks, and keeping themselves quite distinct. This difference in mode of breeding from that of the red-grouse (which pair, the hen laying from six to ten eggs, and both birds attending the young[6]) creates a corresponding difference in the mode of shooting black-game. The young birds having been under the unvarying guidance of the grey-hen, their feeding ground being sequestered, and their food easily obtained within a narrow range, are only endowed with "home-bred wits," and are consequently easily approached. On a brood being fallen-in with on open ground, they may consequently be all bagged by proper management. This may look rather a harsh and cruel thing to do, but the fact is, that unless you wish to preserve black-game where the ground is less suitable for red-grouse, you cannot well have both. Black-cocks especially are positively vermin, and will drive the more

[6] Will any naturalist, sportsman, or gamekeeper, tell the author how many days red-grouse sit on their eggs? It may appear strange to assert—yet he can do so boldly—that no research in books, or by personal inquiry, has ever obtained him this information. Nay, he has never known any gamekeeper, or other, to even hazard an opinion on this matter. This note stood exactly as now printed in "Shooting Simplified," without bringing forth any reply, although every line of that work was evidently keenly scanned by critical eyes.

highly-prized red-grouse off the ground. Besides, although so easily shot at the beginning of the season, black-game, as will be further explained presently, are very shy afterwards, and are far from being likely to be much thinned.

The scent from black-game being strong, all that is needed at the beginning of the season is to approach the ground slowly, hunting one steady dog, and preparing yourself for rapid action when the birds are made out. At first No. 6 shot will prove effective, but later in the season use No. 4. At the first point the birds will sit close, under the very nose of the dog, the grey-hen being most unwilling to rise, which is rather trying to the nerves of the young sportsman. But let him wait patiently; he is sure to get easy shots at birds going right out from him. At last the old grey-hen gets up with a prodigious flutter. Take a steady aim at her head alone, make sure she does not escape you, and down she falls with a heavy "thud." Immediately another bird rises, probably the largest and most promising young Lyrurus—down with him in like manner. With a spare gun, or a breech-loader, you may have them all—without these, go on to load as rapidly as you can, no one advancing an inch or lifting the fallen game. Having loaded, advance very slowly, step by step with the steady old dog, and the birds, rising one by one before you, are either brought down, or marked-in individually. They will not fly far, and may be easily made out, unless some peculiarity of the ground favours their escape. Such is the fate of many a brood of black-game; but let this

dangerous season be once passed and the sport assumes another aspect. Leaving the flat, sedgy meadows, the grey-hen leads her young to the outskirts of corn-fields, and among thickets of birch and alder, and of that fragrant shrub termed "gall-wood." Here they become partly gregarious; and when they feed upon exposed ground place vigilant sentinels, whom it is almost impossible to deceive. Now a quite different style of shooting must be followed; and in the early morning and in the evening you may get a few good shots by ensconcing yourself in ambush, getting only sitting shots, however, and not lifting your birds until all is over. But this is poor work, and would not be lawful at all to the genuine sportsman, were it still possible fairly to hunt for and kill black-game over dogs, which is now out of the question, beyond the occasional chance of an outlying single young bird. In ambush you must remain perfectly quiet; the use of a breech-loader will enable you to do this: if you have only a muzzle-gun load rapidly and silently, and again ensconce yourself. In a few minutes birds will likely arrive from fresh quarters to feed, especially if you be near a stubble field. Black-game are said to generally follow the same line of flight, so that at the point where a bird has passed which you have not fired at, it is most probable that you will get other shots immediately afterwards. My own experience agrees with this.

Another way of following black-game, when become wild, is by beating the coverts. This must be done properly and with great caution. The birds will either sit very close in thick bushes, or slip away to the other end

of the covert and be lost. Send in one man only, with a steady old dog, to do the best for you according to circumstances, as no rule can be laid down. At one time black-game will rise from the covert on loud sounding wings, at another you only get a glimpse of them through a bush as they go off in noiseless flight. Keep on the outside in advance of the beater; and if the dog points at a bush, send the man round to the far side to beat the bird out from that side and towards you. Take every advantage of open spaces to have free scope in firing (never, if possible, getting under overhanging branches), and when your man goes into the thickest parts he may beat and shout lustily. Never refuse any fair shots in the hope of getting better, as black-game may often be found in abundance for a minute or two, and the rest of the covert to be quite empty. They will fly off from the far end with a steady flight and outstretched necks, looking like so many wild ducks, to some distant shelter across a glen or even an arm of the sea, and for the present be seen no more. If the birds are evidently running before the beater, slip quietly along to the extreme end, or to the first break or "ride" (open passage), and take up your position there, keeping very still, the man working on towards you. On reaching the open the birds are pretty sure to rise, and good shots to be obtained. When the shooting of grey-hens is restricted, the young sportsman may distinguish the young cocks by the white feathers in the tail, otherwise for a few months the plumage of the young male very much resembles that of the adult female. The large size and dark plumage of the noble old male bird

(which weighs four pounds) readily distinguish him.

Another mode of shooting the black-cock, one which the author has followed with peculiar zest and success, is "stalking." It is a very common thing in the Highlands to see a cock-grouse, black or red, perch himself on a spot from which he can command a view around, and remain there, almost or entirely motionless, for a considerable period. The red-grouse generally selects a rocky knoll, which can hardly be approached without discovery, and where he sits and crows in triumphant notes. The black-cock's position is more likely to be taken near a covert, or on ground so unequal as to give the stalker a fair chance of approach, provided he uses all those arts, and maintains that guard over his conduct, which give the interest to stalking and enhance his triumph. Having observed by a bird's settled manner that it will keep its post for some time, the first object of the stalker should be to quietly take the bearings of the ground under the bird. Let him observe the run of any water-course or other inequality which will bring him to within forty yards of his quarry, particularly noting the very point at which an uninterrupted shot may be obtained. If the upper ground hold out very superior advantages, let him try that course, but unless these advantages are at least double, let him take the lower course, because birds on the watch always look upwards (as deer, on the other hand, always look downwards), and also on rising seldom if ever fly up hill. Having made up his mind, and (if not armed with a modern close-shooting express shot gun) having both bar-

rels charged with No. 4 green cartridge, the stalker should now pass with an unpurpose-like air out of the bird's sight—it has doubtless been eyeing him all the while—and then rapidly getting into the lowest part of his course, make an immediate advance upon his adopted line, losing not one moment by the way. Choosing some object already marked, after a pause to recover breath, let him creep onwards to it; and now comes his skill. Many men lose their way in woods and on moors with an ease which is astounding to others who possess, according to phrenologists, a larger development of the organ of LOCALITY.[7] The stalker rejoicing in this bump will be pretty sure to find himself, through thick and thin, arriving at the mark he aims at—if not, let him look cautiously about, and, above all, make every detour downwards. This is most essential—throwing himself quite under any possible range of the bird's vision, and taking care not to shake the branches of bushes, the tops of which the bird can see. Again, let him pause to reconnoitre; and when he has at last made out his whereabouts, and the position

[7] The author—at an early period of life—made very long and wild pedestrian excursions in the Highlands, in company with a relative who was certain to wander himself on every occasion where he was permitted to choose his own way. Not only was he sure to go wrong, but nothing could convince him to the contrary, short of his arriving—not a rare thing—at the point whence he had set out. On one occasion the author lost his full share of a day's excellent grouse-shooting through his bag-carrier, despatched for a brace of fresh dogs, utterly losing his way back, where to do so seemed an impossibility, as he was actually never out of sight. It was impossible to convey to the latter—who was many years in the author's service—any knowledge of topography, or of the nature of a map!

of the bird, let him cock his gun with the finger slightly pressed on the triggers to prevent the sound of the click, take off his cap, and, grasping the gun by the handle, ascend slowly, shoving it before him. On reaching the edge of his shelter—if he has not come right opposite the bird, by error or by it having changed its position—let him quietly draw back without a turn of the head or glance of the eye, submerging as it were, into the covert, fall back some paces, make the necessary side-movement lower down, and then re-ascend as before. Now he has hit the precise spot, and through some slight opening he looks upon the gallant bird, which frequently, by its disturbed air, seems to fear danger, yet is not resolved from which quarter it should retreat. Gently thrusting the gun forward, and doing everything in a right line, and not sideways, the aim is at last taken, the lyre-tailed Tetrao falls over dead, even before it hears the report which is its knell, and the young sportsman has achieved a feat which he will value in reminiscence beyond the slaughter of countless poults and cheepers on the "fair-stricken field."

In winter black-game perch on trees in great numbers near turnip and stubble fields, and then demand the particular care of the gamekeeper. Red-grouse, in autumn, also approach stooks and grain stacks, and many are then shot in an unfair manner, and taken by other means, to tell all which, albeit well known to the deponent, would be but to increase the evil. Old black-cocks are also fond of perching upon trees where they can see all around, such as on small islands on a lake; and the finest shot I

ever saw was taken in the following way. While following other sport on the banks of Loch-Chon, in the west of Perthshire, for which my companion was armed with a single-barrelled rifle, and I with a fowling-piece, two fine black-cocks were seen to perch on the topmost branch of a high tree on an island more than a mile to leeward, a brisk breeze blowing. An immediate embarkation was made, and the boat flew before the wind towards the quarry. Now the nerve which can for some minutes retain composure to make a steady shot at a flying object must be pretty strong, the gradual approach with the eye fixed on the birds being most trying; but if this be difficult with a fowling-piece, it is infinitely greater with a rifle. Yet the coolness of the sportsman in question—who always shot with both eyes open, be it marked—was extraordinary. I was to fire second to give the rifle the better chance, yet my friend—a true and fair sportsman—allowed the birds to take wing, and not till then raised his rifle and fired, sending the ounce ball right through the shoulder of his bird. This was certainly an extraordinary shot from a light boat dancing on the water, and rapidly progressing. I was equally successful with my bird, but this shot possessed no greater merit than the distance and height at which it was taken. We both stood erect in the light and bounding boat, and taking all into consideration, I can recollect no other equally successful approach to game, although many a defeat and disappointment. Many fine shots from the rifle may be had at sitting black-cocks, and better sport in a clear afternoon cannot well be imagined; yet the art and practice of stalking them

seem not yet to have met with the attention they deserve.

Black-game might probably be successfully introduced into the United States of America. Their powers of flight and modes of life and feeding strongly recommend them to acclimatizers.

THE CAPERCAILZIE.

SINCE the modern system of planting large tracts of the Highland districts with fir-trees has begun to reclothe parts of the country with forests, such as existed in the olden time, when the wild-boar and the wolf haunted our Scottish hills, an attempt has been made to reintroduce at least one animal formerly indigenous. The Wood-grouse, Cock-of-the-Woods, or Capercailzie—*Tetrao Urogallus*—is the largest of the Tetraones of Europe, and is rivalled alone by the bird known to hunters in America as the "prairie turkey;" not the "wild turkey,' be it observed. The fine American species is now called the Cock-of-the-Plains, *Tetrao Urophasianus* of Buonaparte; and however proud American naturalists may be in adding it to the fauna of their great continent, it does not surpass in size or beauty of plumage the magnificent bird which, in a few years, it is hoped, will be again abundant among us wherever tracts of fir forests will afford its proper food of cones and young shoots. Until then the Capercailzie will not be a fair object for sport, and it is

only mentioned here incidentally. This noble grouse, on being disturbed, usually alights on a tree, and in northern countries they are there shot, certainly not in the most sportsman-like manner. They weigh sometimes as heavy as fifteen pounds; the females, however, being much smaller, and resembling the grey-hen in general appearance, while the male bird is principally black, marked with glossy-green and grey. The hen lays from eight to sixteen eggs, and in general habits the Capercaillzie resembles the Black-cock.

THE PTARMIGAN.

THE "White Grouse," the Ptarmigan, *Tetrao Lagopus*, dwells amid the rocks, snows, and storms of our highest mountain solitudes. There is something peculiarly interesting in this little bird braving all the terrors of these wintry wilds, voluntarily denying itself the amenities of the milder climate to which a few minute's flight downwards from its heights among the mists would bring it. There cannot be a finer manifestation of a governing instinct among the lower animals than the fact of the Ptarmigan—by nature an Arctic bird, and in all probability originally introduced into this country by accidental causes—perhaps by a few individuals having been blown over in a gale of wind from Iceland or the hills of Norway—thus finding in altitude that climate which it should possess through dwelling in a higher latitude. It is now asserted

(1875), however, that the Scottish Ptarmigan is distinct from the foreign. Its presence here points to the conclusion that at a remote period Scotland had an Arctic climate. True to its original nature, no length of sojourn or number of generations has modified its habits; it remains the same, burrowing in its native snows, or screening itself from the blast behind a granite boulder, and looking down with contempt upon the smiling landscape outstretched beneath it, and so easily within its reach. Rather smaller than the red-grouse, the Ptarmigan is in summer of a greyish-brown, gradually changing as autumn and winter advance to a pure white, but retaining the distinguishing marks of well-feathered legs and feet. The true grouse, Black-cock and Capercailzie, have the so-called leg, but in reality the instep, partially feathered, and the toes not at all so.

To lay down rules for the pursuit of this exceptional and interesting bird—even had I ever practised it, which I have not, writing only from experience of what I do treat, however imperfectly—would be quite uncalled for. Loath to be a means of disturbing this dweller in the lofty wilderness, I gladly take refuge in what few authors are willing to admit—ignorance—and substitute a few lines hastily composed in honour of a bird for which somehow or other I have ever entertained a peculiar admiration:—

Far up on desert mountains lone—
Where all is rock and cold grey stone,
Save where the hard and glist'ring snow
Mocks at the noon-sun's fiercest glow;
Where nought of vegetable life
Can bear the elemental strife;

Nor track of foot, nor sound of wing,
The presence tells of living thing;
Where even the blood of him, whose tread
Climbs the scathed mountain's mist-wreath'd head,
Bounds through his frame in unwont play,
As if to warn his steps away—
Yet can be found one creature fair,
To mark that breathing life is there!
The PTARMIGAN—whose kindred race
On Greenland's icy shores we trace,
Or by that Hyperborean bay,
Once hail'd as route to far Cathay—
Loves there to dwell, nor seeks to know
The placid scenes outstretch'd below;
Where far beneath her cloud-girt nest
The grouse and grey-hen seek their rest.
In vain the seasons come and go—
In vain for her the wild-heaths blow—
In vain fair Spring, with flowery grace,
Would lure her from that barren place;
Summer in vain his glory pours,
And Autumn opes his golden stores;
In vain fierce Winter's ruthless gale
Would drive her to the shelter'd vale.
Her love of Home these wiles disarms;
For her those deserts have their charms.
Oh let her there unharm'd remain,
Nor grudge her that poor, rude domain!
Rather rejoice that, unlike man,
The lone but lovely Ptarmigan—
Pleased with her scanty mountain fare,
The open skies and ambient air—
Seems to our earth on purpose sent,
An emblem of sublime content,
To show how beauteous lives have thriven
On nought save penury and Heaven!

PARTRIDGE SHOOTING

AFFECTS the movements of the English people in quite as great a degree, that is, more generally, although less intensely, than grouse-shooting stirs a less numerous class. For one man that shoots grouse, perhaps fifty men shoot partridges. The partridge is the "bird," *par excellence*, of the low country sportsman, by whom the First of September is looked forward to with somewhat of the same feelings as the Twelfth of August is by the grouse shooter. Somewhat of the feelings only, however, because the First is merely the legal day of opening; and however ardent the sportsman may be, his movements must be regulated very much by the state of the harvest. This is especially the case in the North, where too often "Winter, lingering, chills the lap of May," and where the fields are sometimes not ripe for the sickle in September at all. This gives a less enthusiastic character to partridge-shooting, whereas we know that both in Scotland and England grouse-shooters are nearly all simultaneously abroad on the Twelfth, and we keenly canvass the chances of success as governed by weather and other causes. But "the First" is a day of friendly gatherings, family re-unions, and of great brotherhood and enthusiasm.

The partridge, *Tetrao Perdix*, is widely scattered over Europe, and is particularly abundant in the British Islands. There is only the one variety, as acknowledged by naturalists, indigenous here, exclusive of the French or Red-legged Partridge, *Perdix Rufa*, which has been

introduced into England, and which is the partridge of Scripture. Notwithstanding, I have repeatedly shot, on cultivated land on the edge of Highland moors, what appeared to be a smaller variety than the common; they are shy and cunning, not rising readily, and often running several hundred yards before the dogs. This seems to be a distinct species of the bird, not produced by climate only, because at one place in particular, where this small partridge is found, the shores of the Kyles of Bute, the climate is peculiarly genial, and pheasants thrive well.[8]

This bird is lighter than the common partridge, more elongated in shape, and more shy and wary. The legs are long, set far back, and of a reddish colour. You may flush them backwards and forwards for hours without getting a shot, unless they be driven into potatoes

[8] Several persons have told me that I am correct about the existence of this species; notably the late Hector Urquhart, the excellent Gaelic scholar, head keeper at Ardkinglas. Mr. Urquhart was a keen observer, not likely to deceive himself, and always agreed with me that the reason why this little partridge is not better known and classed is the difficulty of obtaining specimens. He followed one for hours, on one occasion, to secure it for me, and at last wounded it, when it took refuge in a deep, rocky cavity. After much trouble he got hold of it, and took it carefully home, where the cat, as in the other instance, not having any care for objects of natural history—except substantially—made a quiet meal of it in the silence of the night. Just as this is passing through the press, I have the pleasure of learning, during a conversation with that sound authority on Natural History, Squire Jackson Gillbanks, that I am quite correct about this little partridge, which has, after having been noticed by one or two of the older naturalists, apparently dropped out of sight! It should certainly now be classed. I believe I am the first modern writer who has drawn attention to this partridge.

or turnips. On bare land they may be marked-in distinctly, yet not a trace of them be found on going up with the dogs, escaping by some method unknown in other game. I first saw them in the year 1845, while shooting with a friend who called them, with an expletive on their annoying cunning, "red-legged partridges," and who often spoke of their extraordinary power of disappearing. That they may sit so close as to puzzle the dogs, at the same time retaining their scent, may be inferred from an anecdote related to me by a game-keeper, who, shooting in the north, found a covey of partridges disappear in this curious way from before the dogs, and who, making a most minute search, at last found one crouching so closely that he secured it alive. Supposing it to be a cross between a partridge and corn-crake, the correctness of which description showed that he was speaking truthfully, he took it carefully home alive, but that fell destroyer, the cat, which seems to have a peculiar *penchant* for all pets and curiosities, carried it off. His description of the bird quite agreed with the above, which is, in all probability, a variety of Perdix not yet classed by naturalists. Should this turn out to be a distinct species of the partridge, it will certainly be a curious fact that it has so long escaped the notice of naturalists, only to be attributed to its cunning and shyness. The coveys are very small in number of birds. Although the existence of this variety of the partridge has been seemingly questioned, so far from seeing occasion to withdraw or modify the above, I distinctly state that all I have learned by the most diligent inquiry is in favour of its existence.

grain, although the small amount of damage it can by any possibility inflict upon standing crops is a mere bagatelle to the service it renders in destroying insects of the most injurious character.

While the grain is yet uncut, partridges remain in its safe shelter, or, if found out of it, immediately upon being flushed take refuge there. It is, therefore, needless to follow the sport until the grain be almost entirely cut; besides, it is nearly impossible to keep dogs, especially if young, from rushing through the grain—an injury to the farmer which no sportsman should tolerate. The rapid motion of the dog and whisk of his tail shake the grain and do much damage. Such practices often breed ill-will between sportsmen and farmers, and the latter retaliate in many ways, very often by objecting to the former passing later in the season through the potato and turnip fields, when they really do no harm. This and other blunders most young sportsmen—for whose guidance these pages are written—are apt to make through ignorance. Few, if any, books on the subject have ever treated of them; but it is my object to teach, however simply, or however superfluously it may appear to old sportsmen, so as to give the beginner such useful knowledge as otherwise he can only acquire through experience. Many young men who know nothing of country matters would probably deem it less harmful to put a dog through a field of standing grain than for themselves to walk through a field of turnips or potatoes, and most innocently act accordingly. The farmer looks on, perhaps says nothing, but immediately sends in a complaint to the

landlord of wilful disregard for and damage to his crops. I have known a case exactly in point. In partridge-shooting never make a hole through a hedge or other fence—go round until you find an opening, and leave every gate as you find it, or shut it if there is apparent need of it being shut. Avoid driving cattle, or setting cows galloping about. All these, and other general considerations of the farmer's interests, will greatly increase the pleasure of your sport by raising a kindly feeling between you; and instead of entering upon a farm half expecting a lingual contest on some former misunderstanding, which breaks sadly upon a day's pleasure, you will in all probability receive such advice and information, beyond even the gamekeeper's immediate knowledge, as will greatly tend to swell the bag before evening. An occasional present of game to the farmers upon whose ground you shoot is a praiseworthy practice.

The general principles in partridge are similar to those in grouse-shooting. No. 6 shot is the proper size to use generally, yet I should certainly recommend a small charge of No. 7, more especially with the new "Express Shot Guns," for the opening days of the season. I would decidedly object to No. 5, which somehow as a rule shoots most irregularly. Nine o'clock is soon enough to begin; and the ground should first be hunted round the marches, driving the birds inwards, and trying to break up the coveys. Partridges are much more afraid of the gun than grouse, and therefore, when they rise wild, it is proper that a couple of shots be sent after them, which often has the effect of causing some of the young birds to drop

suddenly, or else to leave the covey and take a separate course. They should then be marked in and followed up. The rule for singling out a bird to the aim is equally imperative as in grouse-shooting. Many more impediments to taking aim will be found in partridge-shooting, such as the contiguity of hedges and plantations, which mar the fair sight of the birds, so that in all such cases the bird should be rapidly covered and fired at. They are also often found in patches of whins or furze, and in beech hedges; in all which cases the young sportsman must quietly and coolly await their rising, which they will likely do singly, and fire at once without a moment's delay. When basking at the roots of hedges, a man should be sent round to the other side to drive them out to the side of the gun.

In general shooting, however, partridges are found in open fields, especially at the beginning of the season, and wheat and barley stubble are their favourite resort. The latter has always been a sure find in the author's experience in Scotland, but he does not find it to be so in England. When driven thence, they generally make for the nearest potato or turnip fields. Pointers are preferable to setters; and good, old, slow dogs will make the largest bag. A dog accustomed to partridges, on entering a field, will rapidly course round the boundaries, experience having taught him that birds are most likely to be found there. This may be permitted in a sagacious old dog, but in regular course the field should be hunted from the leeward in the same manner as a moor for grouse, and, if possible, the old birds should invariably be

shot at, so as to thin them off the ground. This is desirable from the fact that old and barren partridges will drive off young and breeding birds from their neighbourhood; and it should therefore be the object of the sportsman to restock his ground annually with young birds. Old cocks are particularly obnoxious to younger breeding birds. When the birds are marked into potatoes or turnips—which latter are in Scotland grown in drills similarly to the former—the dogs should be entered at the leeside and hunted very slowly to windward. The powerful smell of the potato and turnip leaves is destructive to the scent, and the birds are also apt to run rapidly along the drills before the dogs; yet, notwithstanding, these fields are considered a safe place to get birds into, from the certainty that, however puzzling they may be to make out at first, yet that they will sit close and afford shots in the end. Sometimes common partridges run before the dogs, which continue to make false points at the spots where the birds have rested a moment or two. In such cases they always increase their distance, and finally rise out of shot. To prevent this you should caution your dogs to remain steady ("To-ho!"), and yourself go round to a considerable distance in front, and walk back towards the dogs. The birds may now be reluctant to rise, but if so, give a cry, and they will take to wing.

In England, I regret to say, it is becoming the mode to use no dogs but retrievers, the sportsmen walking in line across the fields; but somehow this appears an inferior mode of sport. Shooting, as an art and recreation,

includes much more than merely killing game, and the pleasure of "hunting" or seeing "hunted," a brace of good dogs is more than equal to, and of a higher order than, the actual drawing of the trigger; of course with this proviso, that game be found and killed in fair numbers. When birds allow you to pass them and then rise and give cross-shots, do not forget to take the aim in advance, according to distance and rapidity of flight. This is less needed with the two-eye system of shooting, which keeps the gun moving with the object. When a bird falls among potatoes or turnips no time should be lost in lifting it, unless there are insuperable objections to advancing for that purpose. "Winged" birds are often lost in such fields, running before the dogs, and their scent being finally lost. Even in stubble partridges, when only wounded, will crouch in a furrow and lie so close as with difficulty to be retrieved, especially where the ground is foul with the scent of the covey when ranging while feeding, previously to being disturbed. Their colour so much resembles that of the ground as to cheat the keenest eye. A dog which "seeks-dead" and "roads" partridges well is a great acquisition. Excellent partridge shooting is often to be had on the edge of moorland, when the object should be to break them into the long grass called "bent." From the open character of the ground this is first-rate sport.

When birds are numerous and the lands extensive, markers may be judiciously placed on elevated positions, where they can command a view of the country and watch the birds in their flight. As in grouse shooting, all marked

birds should be followed up and perseveringly looked for. Partridge-driving is now greatly practised. A number of beaters, usually directed by a man on horseback, drive the birds in the direction of the sportsmen, who are ranged about twenty-five yards behind a hedge, and at about fifty yards from each other. No kind of shooting requires greater rapidity and dexterity than this. In the first place, you are under the nervous strain produced by inaction; in the second, you are excited by the flight of field-fares and similar birds coming in advance over the hedge, and distracting your attention; and in the third, when the partridges do come they pass like bullets. If you do not take them as they come on, or before they have passed you, a miss is almost certain. The French partridge is liked by some sportsmen, for the reason that in being driven it leads the others on, and gives better sport. But under any circumstances let the young sportsman remember that, to shoot driven partridges he must fire the moment he sees them: once past him, and they are lost.

Partridges shift their ground very much with changes in the weather, and are most difficult to find after a storm. The author once experienced this in a most remarkable manner. On the day after a great storm which occurred in December, 1848, he hunted, with excellent dogs, one of the finest partridge estates in Ayrshire, Rowallan, the property of the Marquis of Hastings. On this estate twenty brace of partridges could easily be killed on a favourable day; yet on that occasion, with the exception of a covey which suddenly and excitedly rose from among the stacks of a farm-yard, through which the party were making a

short cut, not a partridge could be found in either stubble, covert, or fallow. Whether this arose from their lying so close as to deceive the dogs, or from the tremendous wind of the preceding day and night having driven them into some most unusual quarters, must remain a mystery. They had disappeared somehow, baffling all the ingenuity of keepers of great experience, with first-rate dogs to boot. Hares, on the same day, were all out on the stubble, and lying until almost literally kicked up. The weather was clear, and the air purified by the storm, a gentle breeze blowing; altogether, there was something quite tantalizing in the completeness with which the birds had made away with themselves. During wet weather partridges are fond of turnip fields and furzy coverts, lying very close. Further on in the season they are often found on the fallows. At all times beech hedges are a favourite resort, and when expected to be found there a man should be sent to the other side to beat the hedge with a stick, as mentioned above. This is one of the most difficult partridge shots, as they fly out diagonally at great speed.

During the middle period of the day partridges approach water-courses, and afterwards are fond of basking in the sun for some hours. They feed early in the morning, again about one o'clock afternoon, and also before dusk; and should not be hunted for at these periods, nor when they begin to call with that peculiar "juck," "juck," to which they give utterance in the evening. They are then gathering for the night, and should not be further disturbed. They are partial to the neighbourhood of the field in which they have been reared, and hence the same

ground may be advantageously hunted more than once during the day. When partridges are very wild some sportsmen fly an artificial kite over them, causing them to crouch, and thus afford shots. This is a very questionable practice, being likely, if persisted in, to make the birds wilder than ever, and drive them off the ground altogether. When birds are driven into a small covert, a kite may be advantageously flown over it.

Occasionally when a partridge is struck he "towers" to an extraordinary height in the air—being seemingly incapable of self-guidance. This has been attributed to the bird being shot through the brain or the liver; the former is the more probable cause, as there seems to be no primary connexion between the liver and the power of directing the flight. May towering not be caused by a shot through the heart? One thing certain is, that the throat and bill of towering birds are found full of blood; I never found one instance otherwise. Is the upward flight not an effort to keep down rising blood, pressing upon the optic nerve and producing blindness? Thus the common rook is said to fly perpendicularly upwards, if temporarily deprived of sight, as by the old trick of laying in its feeding-places cones of bird-limed paper, baited with a bit of flesh at the apex of the interior, a puerile but ludicrously cunning, not to say cruel, device. Whatever may be the cause, "towering" is certainly a very curious phenomenon, the bird always falling quite dead. Black-game and snipe also tower, but more rarely.

Partridge-shooting closes on the first of February.

PHEASANT SHOOTING.

THE common pheasant (*Phasianus Colchicus*) has existed in these islands in a semi-wild state for nearly six centuries, and is commonly looked upon as an indigenous bird. Yet here it is by no means quite capable of self-support, and differs from other game in this, that it must be fed in winter, particularly when preserved in any number. In point of fact, the pheasant cannot be strictly said to exist here in a wild state, but rather holds a middle position between domestic poultry and birds which are really *feræ naturæ*. He is never to be found at any distance from thick coverts, especially such as have a dense undergrowth of brambles and other shelter. In judging, therefore, of coverts, this essential underwood must be looked for by the young sportsman. From this semi-domestic state it also arises, that where pheasants are extensively preserved a large number are raised by the keeper "by hand," from eggs either taken from wild nests, or laid by birds kept in aviaries, termed "pheasantries." It is said that if the eggs are removed judiciously from the wild nests, one by one as laid, but always leaving the first three or four in the nest, the wild hen will in the end lay eight or ten more eggs than she would otherwise do. This may be questioned; but if true, is well worthy the notice of keepers, who may thus raise many more birds. In a wild state the hen lays generally about fifteen to twenty eggs, but only eight or ten in a pheasantry, although to this there are

curious and great exceptions, up to seventy or eighty eggs.[9] In pheasantries, means should be taken to prevent the eggs being destroyed by the male bird; and, as it is impossible to keep continual watch, the hens should be induced to seek a dark secluded corner, by forming for her an artificial nest covered thinly with straw. Under this straw have a net exactly of mesh wide enough to allow the egg to drop through into a box below, filled with soft seeds or shellings, leaving only a few inches between; the cock bird cannot then reach the egg, which falls uninjured on the soft seeds below, and is safely removed. The propensity of gallinaceous birds in confinement to destroy the eggs seems to be very general. The best domestic fowls under which to hatch pheasant's eggs are of a cross between the barn-door and the game fowl. Bantams are also very good; the former may be entrusted with eight or nine eggs. On being hatched the hen and brood are placed in a well-roofed coop on a close-shaven grass plot, the hen never being allowed to go at large. The author published, early in 1856—in that excellent newspaper, *The Field*, which all sportsmen should read—very minute directions for the rearing of the young birds, too long for the purpose of an elementary treatise like this. But he

[9] I remember the fact of a tame hen pheasant, which used to go to the neighbouring woods, in the breeding season, and return regularly in the evening, laying in the hall of the residence of her owner nearly eighty eggs in one spring! This was at about five miles from Glasgow, and I can vouch for the truth of this remarkable instance of fruitfulness, Mr. Scott—the owner—being an intimate friend of my father, and coming nearly every day to tell him of another and yet another egg.

may here mention, that great and unceasing attention is necessary; and that when the young birds are not supported by acidulous stimulating food they invariably droop. This may be prevented by regularly giving them crumbs of toasted bread which has been soaked in chamber-lye—a mode of feeding known to very few gamekeepers, the benefit probably arising from some similarity between uric and formic acids, ants being a favourite food of pheasants. Their other food consists principally of chopped eggs, cresses, ants, shelled oats, and maggots. Maggots, however, should be always scoured and purified by being kept for a night in clean river-sand, and never be given fresh from the carrion in which they have been engendered. The poults are turned out when about three months old. A brood is called a "nide." [1]

Pheasants taken from coverts and placed in aviaries for breeding purposes should be put together not later than January, all the better if sooner. The same may be said of birds introduced to restock coverts. The system of raising pheasants by hand, and the precariousness of their general propagation in coverts, owing to wet seasons and other causes, have created quite a trade in eggs and live birds. This is severely reprobated by sportsmen, *who yet*

[1] The question has been raised—"Do pheasants thrive near the sea?" They certainly do. The author has seen a cock pheasant busily engaged in scraping and feeding among sea-ware on the beach, and some years ago a paragraph ran the round of the London newspapers about a "fine cock pheasant being seen feeding on the beach near Brighton." He has had good stocks on two of his own shootings, running along the sea-shore, without any artificial feeding whatever.

buy them. Were the hens prolific in confinement all causes of complaint would cease, because it would become a business so to keep them for their produce; but so few eggs being laid, a high price must be charged to remunerate for a whole year's expenses. This gives the poacher great temptation to rob nests in coverts, and renders it difficult to point out a remedy for the pernicious practice.

As already mentioned, pheasants are put into aviaries for breeding purposes, or into coverts to restock them, not later than January or February. For the former there should be one cock to four hens. Perhaps a better system is to enclose no male birds, but to have the pheasantries near to the coverts, with the tops quite open, giving free access to the wild cocks. Of course the hens must be prevented from escaping by cutting the feathers of one wing. Hens only one year old are nearly if not quite barren. The male birds should be at least two years old. The variety with the beautiful white ring on the neck are the finest, but they breed indiscriminately. Indeed, the cock pheasant, being a bold bird, will breed readily with domestic poultry, and even with the grey-hen. It has been asserted that the hybrid of the pheasant and domestic fowl is not barren if bred with the cock pheasant, and that the progeny revert to the pheasant type, but are finer and more prolific birds; this is worthy of a trial, but, if true, is contrary to the general laws of animated nature. A white variety of the common pheasant, and the gold and silver species, cannot with propriety be classed among our birds of game. Some common pheasants are of a buff colour.

Pied pheasants, which some admire, are merely birds having disease of the skin, and should invariably be shot off, as the disease, although cuticular, must affect (or be produced by disorder of) the internal constitution.[2]

In pheasant shooting two varieties of the dog, not already treated of, are used—the cocker or spaniel, and the retriever. Both may be used with advantage in other kinds of shooting, the retriever being invaluable, and far too little employed by sportsmen; but, be it carefully noted, I mean by this, in addition to, not in substitution of, the setter or pointer. The retriever, as his name implies, is simply any dog which recovers and fetches game when killed, as some pointers and setters do by nature, while others of these varieties are so taught, especially on the Continent. This is an accomplishment, however, these breeds are much better without. But a proper retriever should be a powerful dog, patient, quite under command, and never leaving your foot until told to do so. The Irish and Tweedside water-spaniels make good retrievers, but want power, to secure which a cross with a genuine Newfoundland dog is recommended. A perfect retriever must possess a good nose, strength, and steadiness, and must take to water

[2] Some magnificent specimens of Chinese and other Eastern pheasants may be seen at zoological establishments. The beauty of these cannot be described in words. Several persons of distinction amuse themselves by cultivating the breeds of these lovely creatures; and I am assured by a practical naturalist, Mr. Gustave A. Frank (son of the eminent merchant in Preparations of Objects of Natural History at Amsterdam), that 500*l.* to 600*l.* is no uncommon price for a pair of breeding birds.

freely, acquiring these qualities by any manner of breeding whatever. He must be soft-mouthed, i.e., he must not injure game while carrying, but, like Izaak Walton with the frog, use them as though he loved them. The produce of a strong Newfoundland dog with a gentle-tempered setter slut is as good as can possibly be advised. Such will both hunt covert well, doing quietly the work of a dozen noisy boys, and retrieve wounded and dead game successfully through goodness of nose derived from the dam. But as good and bad qualities in dogs are hereditary, the young sportsman need not pay particular attention as to how the good qualities have been obtained by crossing provided that they are there, and cannot do better than purchase the progeny of proved parents, regardless of the breed—this being quite a different thing from setters or pointers, which have a certain specific and instinctive work to do, independent of general sagacity. Retrievers are seldom thoroughly trained until two years old; they cannot be broken-in at once like the pointer; hence the best are those which have followed a keeper's steps from puppy-hood, and their price is high when perfect in all their parts. In fact, no dog is so valuable to the sportsman, yet, notwithstanding, they are not used to nearly the extent they deserve. A retriever saves time, game, money for beaters, and also saves labour in trapping, by recovering dead game which would otherwise be lost and serve as food for all sorts of running vermin, which are thus drawn into ground where retrievers are not used.

The "spaniel," "springer," and "cocker," are terms

for varieties of the dog according to size and appearance, but perhaps all of the same stock. They may be called diminutive setters, which they much resemble in appearance. The best breed is the "Clumber" spaniel, which is usually white in colour, marked with large lemon spots. The "Sussex," with brown spots, otherwise resembles the "Clumber," but is becoming very rare. Both are thick-set, strong animals. They are larger than the cocker, and should always be mute, hunting close, and examining strictly every nook and corner, and if possible should be trained to go "down to shot." They are used in all kinds of covert shooting, and sometimes may be brought judiciously into play for grouse, when they sit very close on bad-scenting days. Our staunch little friend, the common terrier, may do much of what the best cockers are capable; and some good breeds of the Skye terrier (not the insignificant and half-idiotic wretches frequently sold as such, which are mere lap-dogs) will do all that spaniels can, even to retrieving. The genuine Scottish terrier, a taller dog than the Skye, and now seldom to be met with, makes an excellent covert dog, especially for rabbits, which it pursues with great cunning and perseverance.

Pheasant shooting opens on the first of October. It is seldom that the coverts are then searched for them, the leaves and underwood being as yet too thick. What birds fall before the gun early in October are generally found in turnips and stubble near coverts. Many sportsmen consider a pheasant the most easily killed of all birds, from its size and heavy flight—yet this is hardly

correct. A pheasant certainly does rise slowly, but it continues to do so to a very considerable elevation, and, besides, spreads out its tail broadly, and in such a manner that the young sportsman is apt to be deceived as to the position of the body of the bird, and from both these causes fires too low. A pheasant rising to a great height, and hence called a "rocketer," is, therefore, a hard bird to bring down, and it is next to impossible to hit him with a gun having much crook in the stock. Grouse and partridges generally rise to a certain height, and then go off more horizontally, but the steady ascent of the pheasant renders it proper to fire at the head only, and then any common size of shot, from four to six, will readily bring them down. As they always fall diagonally, with a wavy motion of the tail, it is hardly possible to know when they are killed dead; and as a winged pheasant will run quicker than a man through covert, not a moment should be lost in sending a dog after a fallen bird. When searching for pheasants in fields, near coverts, always hunt outwards from the covert, whatever may be the direction of the wind, otherwise the birds will run in on your approach. Either pointers or setters may be used, but it spoils any but very old dogs to allow them to enter the covert, where even when they do find, you cannot make out, if the underwood be thick, where the point is. Pheasants are most readily found in the open fields in the afternoon.

"Covert shooting" is the term applied to the sport of driving game of all kinds out of the woods or copse, the sportsmen being placed either on the outskirts, or

in very large woods at open passages called "rides," which are made through the woods for that purpose. A number of beaters, each armed with a stout stick, march in line through the covert, beating the bushes, and enlivening the air with cries of "Cock-cock," "Hey-cock," with such variations as may happen to strike the mind of the more imaginative youth, who is above mere routine. It is customary for one gun, generally the head keeper or a practised shot, to accompany and direct the beaters. The game, disturbed by the steady advance of the beaters, run forwards or to the sides, and, when seen, are signalled to the sportsmen by cries of "Mark, cock," "mark, rabbit," and so on, or by the warning cry that the bird gone off is a hen pheasant—"Ware hen, ware hen." When a shot is fired, all the beaters stop until commanded again to go on, and on no account must one beater advance before the others. The sportsmen, meantime, when on the outskirts, and not placed at rides, advance with the beaters, but keeping up the relative distance before them according to circumstances, in general about fifty yards, making no noise which may deter the game from leaving their shelter. When placed at a ride, the position should be maintained until the very last yard of brushwood be beaten, as it will often happen that game, pheasants especially, when so driven, will squat in the last bush, and not leave its protection until very hard pressed. The same rule applies to the termination of shorter coverts, to which one gun should proceed when the beaters

approach to within 150 yards of it, and where pheasants will often lie on the extreme verge, being most reluctant to rise from their final shelter. Every bush and cover of any kind should at these places be searched most carefully, as pheasants run so low and so cunningly as to gain little nooks and hollows unseen, where they lie close. The author has not unfrequently, even while the thing appeared to be correctly done, seen a whole "bouquet" of pheasants rise from the extreme end of a copse, after the sportsmen had stood for some minutes, within two yards of them, expressing their surprise at finding the covert "blank," the discussion receiving a sudden solution by the startling sound of uprising wings. After the coverts are beaten, all the neighbouring hedges and clumps of bushes and brambles should be searched.

It is customary to shoot cock pheasants only, and to impose a fine upon the sportsmen who break this rule, the money being escheated to the head keeper, or applied to defray the expenses of a dinner at the end of the season, when shootings are rented by a party of gentlemen. This rule is very frequently overstretched. It should not be forgotten that the desired end may be frustrated by having too many hens as well as by having too few, as in whatever way the disproportion of sexes is caused, the result—reduction in increase—is the same. If the cocks are continually killed down, few male birds will arrive at that complete maturity so essential to producing a healthy stock. On the other hand, if the hens are continually spared, they will not

only grow out of proportion to the number of cocks, but the aged hens will beat off the two and three year old birds. There is a well-ascertained fact, that the further polygamy is carried, the fewer males are produced. Very old hens should certainly be destroyed. These may be known by their dark plumage. Hens rise very gently and equably compared to cocks, which beat the air noisily and irregularly when taking wing. The most prolific are the two and three year old birds. When the hen first begins to lay, she drops six or seven unproductive eggs promiscuously through the woods. These eggs are often picked up and sold; this may explain to the uninitiated why bought eggs so very often prove unproductive. There are various modes of feeding pheasants, so as to prevent the grain being picked up by other birds. The most simple is to feed them at regular hours, to which they will soon learn to attend. All pheasant preserves should have sheltering underwood, and there is no plant for the purpose equal to the rhododendron. Pheasants, like partridges, benefit cultivation, by being very destructive to wire-worms and other noxious insects. A half-pint of wire-worms was once taken from a hen pheasant's crop! Their favourite artificial food is buckwheat and *raisins*. Pheasant shooting closes on the first of February.

WOODCOCK SHOOTING.

THE Woodcock (*Scolopax Rusticola*) is a bird of passage, and is found, with trifling differences in size and plumage, widely spread over the northern world. They are well known by their long snipe-like bill, being in fact the largest of the genus to which snipes belong, but differing from them very much in their resorts, preferring thickets and woods, whence their name is derived. Their principal breeding habitat is Norway, but numbers undoubtedly breed in this country, and these are apparently on the increase. In Perthshire, during the breeding season, I have often admired their continued flight, by way of exercise, during the long and lovely "gloamings" of the North. The first immigration from the Continent generally occurs in October, during moonlight, and with an easterly wind. On their arrival they are often found on the coast in considerable numbers, commonly termed "flights:" they are then thin and weak, and are easily killed. On the west coast of Scotland they are to be found out on the heather, but as the season advances they take to the woods, and become solitary. Along burn-sides, among thick patches of heather, or in dense coverts, they lurk during sunshine, being semi-nocturnal in their habits. If the day be bright, they are fond of the comparative darkness of the evergreen holly. The best woodcock shooting is to be found in Ireland. No bird is more irregular in its habits than the woodcock—one day flying slowly and to a short

distance, the next going right away to seek a distant shelter. This uncertainty and their solitariness give great zest to his pursuit, and a "cock" is spoken of at the termination of a day's sport as something of peculiar interest, not lessened by its delicacy as an article of food. The first cock of the season on a shooting manor is also an event of which the successful sportsman is proud. To furnish an idea of the irregularity of their habits, the author may mention a circumstance within his own knowledge. A sportsman—a crack shot—killed, in one season, in Mull, one of the Hebrides, 199 couple of woodcocks. Resolved to make out the 200 couple, he continued to beat for them for a whole succeeding fortnight without getting another shot, and left the island with his purpose unaccomplished! As spring approaches, and during frost, they again draw towards the coasts, and are much followed after when the season has closed for other game, it being lawful to shoot them during any period of the year to which the Government licence extends. February is a good month for this sport on the west coast and in the Hebrides. There is a common belief that woodcocks, snipes, ducks, and rabbits are not strictly within the protection of the game laws, but this is a mistake. The pursuit of none of these can be followed by unlicensed persons without infringing the game laws, with the following exceptions. Farmers or warreners may kill rabbits on their own lands, and with permission from their landlord. Ducks may be killed within tide-mark, but snipes and wood cocks are closely protected, with the curious exception

that the latter may be lawfully taken in horse-hair nooses. "Springes to catch woodcocks," as old Polonius says, may be set by any unlicensed person, subject of course to the law of trespass. It would be in vain to point out to the young sportsman any one method of pursuing cock-shooting. It is quite similar to other covert shooting with beaters or dogs. The only general advice to be followed is, to fire at the birds however close. Their small size of body prevents any reasonable chance of the shot "blowing them to pieces." At the same time distant shots should be freely risked, as when struck they are easily brought down. This is so much the case that I believe they not unfrequently fall through sheer fright. I have more than once stood beside a fallen woodcock until I deliberately reloaded my gun, and then seen him fly briskly away on my stooping to lift him, on one occasion leaving some tail-feathers in my hand! No. 7 shot is the best size. It is needless to attempt to make further remarks, where no guidance can really be given, and where the practice of one day may be diametrically opposed to that necessary on the very next. The coverts must be beaten in the usual manner, and the birds, when not killed at the first rise, followed up according to circumstances.

SNIPE SHOOTING

NATURALLY follows that of the woodcock, but is more amenable to rule. There are three common varieties of the snipe in this country. The common snipe, or Heatherbleater, (*Scolopax Gallinago,*) is that found most plentifully. Then there is the eccentric little Jack-snipe, (*S. Gallinula,*) and the Great or Double Snipe (*S. Major*). All three are migratory, and their general habits are similar. Other rare varieties are occasionally to be met with. The common snipe breeds with us to a limited extent; and in very dry weather in July and August may be found congregated in large numbers on marshes and water-runs, near extensive moorish uplands. I once rented a small moor, Peelhill, in Avondale, Lanarkshire, where in dry weather in August hundreds of snipes rose at the report of my gun from the quagmire borders of a little tarn, termed Loch Gett. Their habits seemed altered by their numbers, displaying all the usual restlessness and watchfulness of birds in large flocks. Outlying single birds in the immediately neighbouring fields sat to points as usual, but the discharge of a gun on the edge of the sheet of water sent the whole of the flock a-wing, uttering shrill cries. They were undoubtedly the old birds which had bred in the boundless surrounding moors, accompanied by their young, and driven by the drought to the nearest piece of water and marshy ground. I certainly

there saw in one week as many snipes as most sportsmen in Scotland do during a whole lifetime.

The popular belief that a snipe makes the most difficult of all shots has arisen from its comparative smallness, its sudden rise, and swift, corkscrew flight. When shooting snipe over dogs, the best modes of killing them may be reduced, generally, to two. These two are, either to fire the moment the snipe rises, or to give it time to get over the tortuous and resume the direct flight. Thus extremes meet, and one man is a crack shot at snipe for being very quick, and another quite as crack for being very slow. One of the latter caste manages thus:—Carrying his gun over his shoulder, in the other hand he holds between finger and thumb a pinch of snuff. A snipe rises; with due deliberation and emphasis he inhales into each nostril the titillating grains; down from the shoulder comes the deadly tube; it is levelled, fired, and Scolopax is done for. Wonderful analogy discovered by this original-thinking philosopher between the period necessary to take snuff with full enjoyment, and the mode of flight of the poor heatherbleater! This particular mode, first direct, then tortuously, and finally direct again, may be called the normal flight of snipe, when they sit close, as in warm, dull weather. During frost their flight is much more rapid, requiring instantaneous action on the part of the sportsman. In blowy weather they fly more slowly, and usually face the wind—so that it is quite common to hunt down wind, against all general rules in hunting for other game—but the aim is perhaps more difficult then than at any other time, and must be steadily taken. No.

8 is the best size of shot, with a light charge of powder to prevent undue scattering. It is not to be supposed, however, that the snipe is very easily brought down, like the woodcock. Having a great expanse of wing, it flies easily, and unless winged or struck on the head, a snipe will fly a considerable distance after receiving a body-shot. They are easily marked-in on open ground, flying high before settling down, and seldom going far off. They run, however, after alighting, and the author cannot call to recollection a single instance where he found a snipe exactly where it was supposed to settle. With a steady dog, coolness, and due attention to the above remarks, the young sportsman may readily become a good snipe shot, and having once got over the belief in its difficulty, will find it quite as easy as any other; certainly very much more so than pheasants or grouse late in the season. The Double and Jack Snipes call for little notice. I once spent several hours on a level moor in Renfrewshire, in pursuit of the former, without obtaining a shot—the birds rising as regularly about eighty yards out as if at the word of command. This is unusual, however. Their general habits are solitary and shy, and they are easily killed. As for Master Jack, he is such a queer little elf, that were it not for the delicacy of his flesh, he might be let alone altogether. Now squatting close, anon going away as slovenly as an owl, then a run, and again a flight, escaping your shot unless you use "dust," it is only after you have acquired a thorough contempt for him, by reason of his mean and artful dodging, that you become suddenly impressed with a sense of his power to come out

strong under difficulties, and you see him go off like an arrow and leave you wondering at your slowness in not despatching him in the first instance, while yet in his original simplicity. And then only consider his diminutiveness! Wrens and humming-birds! To see a youth of six feet in his Shetlands, attended by a hirsute keeper, hunting a dewlapped old pointer, a bag-carrier hovering in the wake, not to mention a retriever of the breed termed Newfoundland, all enticed into pursuit of a feathered biped whose weight in the scale would be overborne by five half-pence of Her Majesty's coin in copper! Turn aside at once and seek a nobler prey.

WILD-DUCK SHOOTING

MAY be classed generally into three kinds—that of the young birds, termed "flappers;" of the old birds on fresh-water lakes and streams; and of the latter, with their numerous congeners, on the sea-coast and estuaries of our large rivers.

Flapper-shooting begins generally about the 20th July, a few days sooner or later, according to the state of the weather during the laying season. They are found on all water-courses and marshes where wild ducks breed, or among reeds on lakes; for the latter sport a boat being necessary. During dry weather they are easily found on mosses, being then confined by their aquatic habits to the

wettest part of the ground; but during rainy weather they spread widely, and to find them is often a laborious task. At all times you must search for them with a good, bold, but close-ranging retriever, or a steady old setter. When very young they are readily killed, but when full-feathered they rise rapidly, and afford fine and not too easy shots. The favourite size of No. 6 shot will be found by far the best; indeed, it is difficult to say for what kind of shooting (excepting always the smaller birds, as snipe and woodcock) it is not the best. From a boat and among reeds, flappers are easily found and killed. When old enough to rise freely their ascent is rapid and continuous, so that the same style of shooting as at a rising pheasant should be practised, aiming at the head only. While shooting grouse in August, wild ducks are frequently met with in moss holes, and they then rise with great quickness, and their flight being so different from that of grouse, to which the hand and eye are for the time accustomed, they are therefore very likely to escape. Firing high will, however, compensate the rapid ascent and error of the eye, and bring them down; but as they carry off a considerable shot, a bird which goes away apparently unstruck should be carefully watched and marked-in. The smaller *anatidæ*, such as teal, rise almost perpendicularly, with their heads erect, turning at the same time as it were on their axis, so as to render the aim somewhat puzzling. A cool, deliberate, and high shot will alone bring them down, the more so that they are small in size, and if struck by only one or two pellets their strength will carry them off.

Old ducks may be followed with success during frost upon running streams, to which they betake themselves when the marshes and ponds are clothed in thick-ribbed ice. Rivers with high banks are the best for this sport, where you can approach the birds unseen, and get excellent shots as they rise. All this kind of sport is, however, uncertain and desultory. No. 4 is a good size of shot, if No. 6 is not still preferred, and for far shots wire cartridges may be used to great advantage. A retriever is of course indispensable, but he must be thoroughly under control and kept close in; and it is only on few places, such as where a stream divides and forms islands among which the ducks may lurk, that they require a dog to put them up. The approach within shooting distance will be found the greatest obstacle to good sport, and great wariness and a knowledge of the river's windings, and of the elevation of the banks, are required to get shots at all.

On large sheets of water and on estuaries, as well as on the sea, duck-shooting with common fowling-pieces is practised most successfully from a sailing boat during a fine steady breeze. On the Clyde, below Dumbarton Castle, there was formerly good duck-shooting, described in "Shooting Simplified," but it is hardly worth referring to now-a-days. There, while yet a very small stripling, I was taken out to the bank by Malcolm Macrae, that prince of rowers, scullers, and duck-shooters, under whose long tutelage I became an adept in all kinds of boating, and in shooting made my first essay, bagging a widgeon with a pride and pleasure since seldom known. I cannot readily forget that when Macrae landed on the bank,

and desired me to scull the boat up the stream, to disturb the birds and send them flying downwards, how I sailed in the duskiness into the midst of what seemed floating sea-ware, which suddenly rose all around with dreadful clamour, so startling and bewildering to my tender nerves as to render me for the nonce incapable of action. Then the whole air suddenly became vocal with the shrill and warning cry of the curlew, the whistle of the widgeon, the scream of the lesser black-legged ducks (*Scotticè*, "*Shinnan*") mingled with the deeper "quack," "quack," of the true or moss duck (*Anas Boschas*), while the motion of their pinions seemed to fill up the interstices of sound, and make the whole air vibratory and tremulous with their passage. Half in fear and trembling, I let bang my little single 20-gauge (what stories could I not tell of that gun, of what it did, and what it did not!) at a flock of something flying past; and heard, literally, the shot rattling, like pease thrown against a barn door, upon their quill feathers, and with a long, sloping fall one of the something came down, proving to be, oh, such a widgeon!

For open sea or estuary duck shooting, a handy but broad-beamed sloop-rigged boat, painted of a light colour, should be used. Running down with a flowing sail upon a large flock of floating birds, which when raised usually fly to windward, you may get shots as they pass, but the principal object is to separate the birds. If two or three are seen to detach themselves from the main body, pursue them at once, gaining their weather gauge. If they have flown near to the shore,

their chance of being bagged is greatly increased. Not showing as much as a finger outside of the gunwale of the boat, run steadily down upon them. Unwilling to fly over the land the birds will permit your near approach, and when they do rise will fly outwards, giving beautiful shots, often right and left. Express shot guns, with No. 6 shot, or in the common bored guns, cartridges and No. 3 shot will be found the most effective, the winter plumage being thick and not easily penetrated.

Good shots may often be had at the duck tribes, where they pass over narrow necks of land on their way to and from their feeding-ground. There is no kind of shooting for which the new close-shooting Express guns are more thoroughly adapted. It is at ducks flying overhead that their wondrous powers are fully displayed, so that a double-barrelled 12-gauge $7\frac{1}{4}$ lb. gun does all the work formerly to be got out of a 10 × 12 lb. PROBATUM EST. They may also be successfully laid in wait for at favourite places of resort; and on the banks of fresh-water lakes it is not uncommon to build huts or other places of concealment, whence the gunner fires forth his volley of large shot upon the unsuspecting palmipedes.

In America sportsmen take positions on certain arranged spots or platforms on purpose to shoot ducks flying overhead. This is a favourite mode of shooting in the West. Ducks are also followed in canoes, and it may be worthy the notice of those not "to the manner born," to know that it is not prudent in these light craft to shoot in a direction at right angles with the keel. If you

do so standing up, and your gun miss fire, by some almost unaccountable reason you will go overboard, right forwards; while if the recoil be heavy, you have nearly an equal probability of going overboard right backwards! The falling forwards of the gun may throw much light on the mystery of recoil being felt at targets and unfelt at game. In the latter excitement there seems to be a latent energy—a power to meet the recoil—if that recoil do not come the negative energy becomes positive, and actually sends the man overboard! Curious as are many things connected with gunnery and shooting, this is to me the most wondrous of them all.

Punt-shooting, with a large stanchion gun, has been reduced to rule in the elaborate work of Colonel Hawker. It is very questionable, indeed, if this *quasi* sport would ever have been much practised, except for market purposes, but for the Colonel's writings. Himself an enthusiast, and of an original turn of mind, having a method of his own in everything, he had the power of conveying a portion of his enthusiasm to his readers. But a few nights on the damp raft—for the punt is little better—poling like a bargeman among oozy tide-ways, half mud and half water, are quite enough for all but the most energetic and persevering sportsman. Yet Colonel Hawker was a great man, and his mind was evidently of that acute class which achieves success and celebrity in whatever branch of human research it is directed to.

MISCELLANEOUS BIRDS.

ALTHOUGH seldom forming distinct objects of pursuit, there are several kinds of birds at which the British sportsman does not disdain to take a passing shot. Such are the Curlew, Whimbrel, Golden-plover, whose flesh is excellent, Coot, Water-hen, Rock and Wood Pigeon, Heron, and Green Plover or "Peese-weep." It is beyond the intention of this simple treatise to discourse upon the little niceties of mode in following these minor objects of sport. Golden-plovers when rising wild should be fired at from any distance—these birds having a fatal propensity to return, as if impelled by irresistible curiosity, to the place whence the report proceeds, thus affording an easy and destructive shot from the second barrel. The wood pigeon, Cushat, is a noble bird, but is most damaging to the farmer, from its mode of feeding and its voracious appetite. In autumn it spreads itself upon laid corn, which it literally threshes out with its powerful wings, beating out twenty times the number of grains it consumes. It is also very severe upon beans and pease, and is said to injure turnips by pecking deep holes through the skin. From all these causes it is considered an enemy to the farmer. The common way of destroying them is by lying in ambush under their roost-trees in the evening, shooting them on the branches as they alight. Beech mast is a favourite food of the Cushat, as are also the seeds of the buttercup; and in the months of July and August the young pigeons may readily be found

in fields where this plant is abundant, where they will sit until a fair shot is afforded, being not so wild as the older birds. Rock pigeons are found in the caves on the coasts of Britain and Ireland, and are killed as they dart out on being disturbed from the entrance to the cave.

Herons are quick of eye, but dull of ear. It is in vain to follow them in open ground, but when one is observed to alight behind a rock, it is easy to steal closely on him without alarm. The Coot is rather of a pugnacious character, and drives other aquatic birds from the sheet of water on which they breed. They are, therefore, so far vermin, and should not be preserved unless no other birds frequent the same pond. The Curlew and Whimbrel are most annoying birds, their extreme watchfulness often frustrating the results of a weary hour's travel in pursuit of game. The Peese-weep (lap-wing) is a most harmless and graceful bird. Its mode of flight, however, often tempts a shot—most frequently an unsuccessful one, the body of the bird being small, and its flight uncertain. The eggs are finely flavoured, and in the season are gathered largely for the London market, where they fetch a high price. With the true spirit of adulteration, which reaches depths beyond even the sounding-line of Dr. Hassall, the eggs of other birds are painted to resemble those of the poor harmless Peese-weep (*Anglicé* "*Pewit*").

Rook-shooting (of the branchers in May) is a favourite amusement with young sportsmen. Properly done, a small rifle is the right instrument. When it is desirable to kill a great number, use large shot, 3 or 4, which knocks

them over at once, as, if not upset by the shock of the shot, the claws contract round the twig they are perched upon, and maintain a grasp for hours after the bird is dead. The question of whether or not rooks are injurious to crops seems likely to be continued for ever. The truth lies on both sides—they are and they are not. They will, in a few hours, root up every grub in a field, and have a wonderful power of detecting, from a great height, ground so polluted, but at other times they feed on seed-wheat and potatoes. If this be the true state of the matter the remedy is self-evident. Let the farmer protect his ground at the right season, and at other times leave the sooty game to follow the plough in security. Rooks, feeding in flocks, are easily seen and scared, unlike the cushat, which works mischief in unsuspected places.

ROE-DEER SHOOTING.

THE author may here incidentally remark, that he has no pretensions to write one line on deer-stalking, although it would be easy enough to compile a chapter thereon. It is not every one who has been to Corinth, and deer-stalking is caviare to the million. The graceful Roe, however, comes within his province. This small deer (*Cervus Capreolus*) is largely on the increase in Scotland, owing to the extent of recent plantations.[3] The rutting

[3] In the woods around Inverary Castle, the seat of the Duke of Argyll, fourteen hundred roe-deer were shot in four years!

season is during the last and first weeks of October and November. The female brings forth in April or early in May, producing two and sometimes three fawns, which she conceals with great care and ingenuity. They live about twelve years, and a good-sized roe weighs about 70 lbs. Like other deer they shed their horns annually, and the mature buck has a very graceful head. The following are the dimensions of a pair of horns in the author's possession, which are the largest he has ever seen. They once adorned the head of a fine roebuck which frequented the woods around Culzean Castle, Ayrshire, the seat of the Marquis of Ailsa. The horns spread into three branches—extreme length, 10 inches; width between extreme points, $6\frac{1}{4}$ inches. Their symmetry is remarkable. These graceful animals usually lie on the windward side of coverts, upon dry spots, within 20 or 30 yards of their extreme verge. When disturbed, they generally take a regular line of flight, and this, being known, is fatal to many of them, the guns being posted on the route. They possess a peculiar habit, in common with the elephant, of slipping quietly off this route when suspicious of danger, and retracing their steps, invariably running round a knoll, never by level ground. In other tactics of escape, the similarity with those of the elephant is truly surprising, such as dipping quietly into hollow places, and out manœuvring the beaters.

Roe-deer go to and fro from covert to covert, so that they cannot always be found even where closely protected. In the night they pass unseen to far distant places of shelter. The sport of roe-deer shooting is practised with

a common fowling-piece. The best size of shot is No. 1. More extended experience has convinced the author that a light rifle is the true weapon for shooting roe-deer, which display great intelligence in keeping just beyond the range of a fowling-piece. Caution must be used, however, in firing towards the beaters. The guns are placed at the wonted passes of the deer, and the woods should be *slowly* beaten by one or two men and dogs. The greatest possible quietness on the part of the concealed sportsman is necessary to insure success. If the roe pass rapidly, giving no prospect of a shot, a slight cough, cry, or whistle, without movement of a limb, will cause the timid animal to pause for a moment, to master the nature of the new danger. A shot is then easily taken, aiming behind the shoulder. When killed, the carcase should be immediately gralloched. The venison is in much lower repute than it deserves, and is most easy of digestion. When lean it may be used in soups, but if in good condition few kinds of food are more grateful to a weak stomach. The flesh of the roe is at its best about the age of eighteen months; that of the barren doe is truly excellent. They are considered very injurious to young trees.

When the ground is suitable—small coverts with wide intervening open ground—coursing the roebuck is exciting but very questionable sport. The best hounds alone are equal to them in speed. The roe runs without apparent effort, but its rapid bounds carry it along with great smoothness and quickness.

A FEW WORDS ON TRAPPING.

SPORTSMEN may occasionally find it useful to have some knowledge of trapping—in which there is great room for the display of ingenuity. Practice alone will give proficiency; and a few lessons, by going the rounds with an experienced trapper, will teach the young sportsman more in a week than he would learn by reading in a year. A few remarks on the leading principles of trapping may, however, not be out of place, premising that the author does not intend to give more than an outline of the art.

Judicious trapping is the mainstay of preservation. The following list of vermin destroyed in three years on Glengarry, Inverness-shire, not only shows the description, but also the proportions, of the vermin usually found in Highland districts:—

11 Foxes.
198 Wild Cats.
246 Martin Cats.
106 Polecats.
301 Stoats and Weasels.
67 Badgers.
48 Otters.
78 House Cats, going wild.
27 White-tailed Sea Eagles.
15 Golden Eagles.
18 Ospreys, or Fishing Eagles.
98 Blue Hawks, or Peregrine Falcons.
7 Orange-legged Falcons.
211 Hobby Hawks.
75 Kites, or Salmon-tailed Gleds.
5 Marsh Harriers, or Yellow-legged Hawks.
63 Gos-Hawks.
285 Common Buzzards.
371 Rough-legged Buzzards.
3 Honey Buzzards.
462 Kestrels, or Red Hawks.
78 Merlin Hawks.
83 Hen Harriers, or Ring-tailed Hawks.
6 Jer-Falcon toe-feathered Hawks.
9 Ash Coloured, or Long Blue-tailed Hawks.
1431 Hooded or Carrion Crows.
475 Ravens.
35 Horned Owls.
71 Common Fern Owls.
3 Golden Owls.
8 Magpies.

The increase of game after this wholesale destruction of vermin was proportionate; but the reader is referred to the chapter on "Grouse disease" for the propriety of exterminating all kinds of so-called "vermin." It is customary to allow gamekeepers head-money for vermin in addition to wages, and if money generally well spent it yet may stimulate unduly. Foxes will not destroy game to any appreciable extent where they can get rabbits. Hedgehogs are supposed to destroy eggs, but many experienced sportsmen deny this. The evidence, *pro et con*, is, on the whole, rather against their innocence, and it is well ascertained that they rob poultry-yards of both eggs and chickens. But the following anecdote is decisive. A most intelligent gamekeeper informs me that he once saw a hedgehog bring a very young rabbit from its nest, kill it, and suck its blood. The destroyer then went and fetched another young rabbit, which was immediately despatched in a similar manner. The mode of killing was to fix the teeth right upon the mouth and nostrils, which in Scotland is called the "fox's grip," and then to suck the blood from the same wound. This anecdote may be relied upon as genuine and authentic.

House-cats run wild, or addicted to hunting, are perhaps the most destructive of all vermin, and are a standing cause of war to the knife between their owners and gamekeepers. It may be a cruel, but yet a timely, hint to observe, that cats whose ears are cropped have no tendency to hunt wild; at least, so say gamekeepers. The author once shot a most powerful domestic cat, but evidently gone quite wild, dislodged from a rabbit burrow, and his

very next shot was to kill an immense rat, likewise sprung by the ferret, with the most beautiful rich brown fur on back and sides, and with that on the breast and belly of pure white. Many dogs, crossbred curs, are most inimical to game, driving them from woods by incessant hunting and yelping. Collies, if permitted, chop young grouse. Owls are harmless on the whole, and the fern-owl, or goatsucker, is quite so. Hooded crows are very bad. Robbing nests of their eggs by inserting the closed bill in the egg, and then exerting an opening pressure on the mandibles, so as it were to wedge on the egg, they fly off to where they find water, and there devour the contents. Why they carry the eggs to water is not known. A similar thing is practised by the raccoon, which always washes its food if water be conveniently found. Seagulls are sad egg-caters, and will devastate grouse moors lying near their breeding-places. Jays and magpies should be rigidly kept down. Magpies are cunning and wary, yet may be destroyed by any active gamekeeper who will take the trouble to rear a tame one and train it to squeak when desired. So provided, let the keeper conceal himself in a covert, set his bird "a-talking," and the wild ones near will shortly come around and afford easy shots. This may be said to fairly turn the poor bird's chattering propensities against itself, but larger and more pretentious bipeds suffer from a love of gossiping as well as the magpie. Stoats and weasels are particularly destructive in the low country. Black-cocks and old birds of any kind may be classed among vermin, in so far as that they beat off younger and more productive birds. Otters very rarely

attack other prey than fish, but will take rabbits in their burrows.

It is questionable how far the destruction of the eagle and larger falcons is advisable. These noble birds drive off the smaller and more insidious vermin. Writing now in 1875, I would emphatically recommend the preservation of the falconidæ as one preventive of grouse disease. Kill off all egg-eaters and stealthy marauders as you will, but spare the falcons which are certain to strike down the weak birds in which disease is first engendered, and which rapidly disseminate it by poisoning the small watercourses to which they resort so much, when attacked by the malady; to allay, it is supposed, a raging thirst, probably produced by inflammation of the liver. The following hints are the substance of letters by the author of this treatise, published in *The Field* in 1856. The reader will find, in the winter numbers of 1855-6, most instructive letters in that newspaper on vermin trapping.

"In trapping hawks, it is necessary, in the first place, to draw a distinguishing line between birds which strike a living and those which the more readily feed upon a dead prey. The falcon, merlin, and sparrow-hawk are bold game birds, and the art of trapping them is very different from that of taking the buzzard, ringtail, and hen-harrier. The eagle may be rather out of place here among his smaller congeners; and it is enough to state that the best possible bait for him is a live white cat, pegged to the ground so that it may keep its legs moving, and so placed among three spring-traps as to render the capture of the eagle certain when he is striking and killing

his quarry. (The taking of the eagle at all is only justifiable where it may be doing serious damage among sheep or lambs.) The falcon may be taken in the same manner, using a live pigeon as bait. The sparrow-hawk and merlin may be best taken with a piece of scarlet cloth fastened upon the plate or table of the common spring-trap, or a circular trap (best sizes 5 to 6 inches in diameter, with a spike to be driven into top of pole, and a chain and spike when used otherwise) placed upon the top of a stone or earthen hillock. The sparrow-hawk hunts over the same ground regularly, going his rounds so punctually that, where he is observed to-day, he may confidently be looked for within ten minutes of the same hour to-morrow. Let the trap, baited with red cloth, be placed as above, and he is sure to strike at it. Another excellent plan is to place on an exposed situation a common wire cage, containing several live larks or other birds, with well-limed twigs on and around the cage. The falcon, sparrow-hawk, and merlin are sure to make a dash at a cage so situated, and get limed.[4]

"To take the buzzard, ringtail, and hen-harrier, let it be observed that these birds are best taken with a dead bait, and that nothing is better than a rabbit or hare. The mode of trapping lies in the fact that they light upon an elevated spot near the bait to reconnoitre, as it were, before proceeding to feed upon it. Let their hunting-

[4] I have seen a very ingenious wire trap, the top of which, when a hawk strikes at the birds within, shuts, and the marauder is himself encaged—a horizontal division still separating him from his intended prey. Although there was, for a time, quite an outcry for such a painless trap, the invention met with no success!

ground be observed, and where no natural hillocks or large stones are found, let the trapper proceed to throw up earthen hillocks, or small cairns of stones; or where wood is to be got handy, let him drive in poles of five to six inches in diameter, height from three to six feet, with a flat top. Upon these let him place some common moss, and leave them for a few days, until the birds have become accustomed to see, and perhaps light upon, these new objects. Then let him place his traps upon them, laying within the distance of a few feet his bait, so that it may be easily seen by the hawk flying over, which will then alight upon the nearest elevation, where the trap is, and be taken. The jaws of all traps should be smooth, without teeth, and should not come quite close together, but have a little space between, by which the limb caught is prevented from being cut off altogether; and the whole must also be so covered with moss that the hillocks and poles may present the same appearance as they did before the traps were put down. There is no rule for the distance from one another at which the traps should be placed. Much depends upon the nature of the ground; but they need not at all events be within a quarter of a mile of each other, and of course may be much further separate on wild, uncultivated ground. Scotch gamekeepers excel in the art of trapping hawks, and the above is their mode; but no trapper will excel in his art who does not study the habits of the vermin he wishes to destroy."

"The eagle and falcon, I have every reason to believe, are friends to the gamekeeper, by destroying and scaring away other and more bloodthirsty vermin. A few years

ago eagles were plenty in Sutherlandshire; and a keeper there, boasting to a friend of mine of having trapped eighteen of these noble birds in a certain period, had a new light thrown upon him when a very marked decrease in his grouse was attributed to the real cause. The peregrine banishes the hooded crow from near his nest, and the benefit to the increase of game thereby given may be guessed from the fact that the hooded crow diligently hunts for the nests of game; transfixes an egg upon his beak; invariably, from some curious reason, carries it off to a pool of water, upon the brink of which he quietly sucks its contents, and then returns for another. At one pool of water in Dumfries-shire upwards of ninety egg-shells were found in the month of May—seventeen being pheasants', and the remainder principally of black-game. This is wholesale destruction compared to grouse being the occasional quarry of the peregrine, whose favourite food is the wild duck and rock-pigeon. The difficulty of trapping the hooded crow, and of holding the raven when trapped, have induced the use of that detestable strychnine, the mere effluvium of which in an apothecary's shop, when making a purchase for a nobleman, so sickened me as to give me a lively horror of it ever since. *Horresco referens.* To those keepers who may be deficient in the knowledge of how to trap the raven and hooded crow effectually, the following may be of use:—

"On the edge of a pool of water or rivulet, sloping into deeper water, let a trap be thus placed and baited. Take a common hen-egg, blow it, and fill it with soft earth.

Insert a pin of wood by the side of the egg; thrust the other end of the pin into the bottom of the pool so deeply that the egg is just afloat with the water, at the distance of the trap's length from the brink. Set the trap end-on to the egg, covering it neatly with moss, so that the bird uses it as a bridge to reach the egg and gets trapped. Have the trap-chain long, and the bird is at once quietly drowned and disappears, however slightly caught, and thus does not alarm his friends and neighbours; and every keeper knows how sly vermin become on ground regularly trapped. The raven makes such violent efforts to escape from a trap, that this quiet submerging method is the only sure way to capture him, and not to find that he has been there and disliked his treatment so much as to depart at any sacrifice, leaving a foot or claw behind as his P.P.C. Running vermin are also readily taken in a trap so set; and even when the water is not deep enough to drown a raven, the wetting of his wing feathers weakens his powers of escape.

"I think we must all admit that falcons and merlins do prey occasionally upon grouse and partridges; but do not let us forget their nobility of nature, their ancient renown as the companions and mark of gentlemen, and out of their very speed and courage raise a cry for their destruction—forgetting the more crafty, insatiable, and often invisible prowlers, which are infinitely more inimical to game, and which I verily believe to be kept down by the higher members of the great family of Falconidæ."

To trap running vermin let it always be borne in mind

that they hunt along water-courses. Look there for their marks, and set the traps accordingly. For the common steel traps, hang the bait so that the attention of the vermin is withdrawn from the concealed trap, over which it is induced to walk, by forming a little avenue of twigs or stones. Let the traps be always clean, and avoid leaving any scent thereon from your hands. Better still, when once a weasel has been caught—especially a female—let no bait be used, as the effluvium will be sufficiently attractive. For otters, place a common-sized trap, attached to a chain and rope, on the edge of a deep pool, where their marks show they are in the habit of leaving the water. To the rope, a yard from the trap, attach a stone or a few pounds of lead. On being caught, the otter instinctively seeks the bottom of the pool, and the weight there drowns him. Have no faith in large traps for these, or in fact for almost any animal, as they will free themselves therefrom at the expense of a limb; whereas the smaller, light trap, with a sufficient chain, is knocked about, but does not give enough of resistance to allow the dismemberment of a limb.

For stoats and weasels an excellent trap is simply constructed of an oblong flat stone, one end resting on the ground, the other supported, in a sloping position, by a slip of wood standing on end. To this upright a diagonal and horizontal piece are attached by notches, forming exactly a figure 4. To the right hand extremity of the horizontal limb, where the point is near the above figure, attach the bait (a small bird is suitable), which when moved causes the fall of the whole fabric,

and the weasel is crushed. These traps are not only cheap and effective, but are not likely to be stolen, and also do not destroy game. They also lure the other vermin to the place when one has been killed, as the weight of the stone presses out an attractive effluvium from the dead weasel.

Should, under any circumstances, strychnine be used to poison vermin, the most efficient measures should be taken to prevent accidents therefrom. The best way is not to use it at all, and no man can be held guiltless who, knowing its fearfully destructive nature, places this deadly poison where there is any possible risk of the loss of life to men or cattle. The eye of the law has been directed to this mode of destroying vermin, and in Scotland it has formed the subject of admonitory proclamations by the Sheriffs of counties. It may not be out of place to mention that camphor is maintained to be an antidote to this poison. When convulsions have destroyed the power of swallowing, camphorated injections may be given, and the patient placed in a camphorated bath. But the rapid action of this drug renders curative measures of little avail, and the only safety is in its entire disuse.

COMPENDIUM.

CARRY a gun within your strength.[5] Have the stock

[5] I accidentally omitted to state, in my advice as to choice of metal in gun-barrels, that a great proof of the superiority of "Da-

as straight as a broom-shank, if you can get your eye to it at all. If you require, on lifting the gun, to dodge your head about to catch the centre of the breech with the eye, the gun is worthless to you, although it may be invaluable to a man of different build.

See that your gun be perfectly clean and free from stoppage at the nipple. N.B.—Carry a nipple-key, with spare nipple, or breech-loading plungers, on all occasions.

In loading, invariably charge the barrel farthest from you first, and when one barrel only is to be charged, place the gun so that that barrel is on the outside. This will prevent all mistakes. In loading one barrel, see that the other lock be on half-cock. Use as little shot and as much powder as the gun can carry properly.

For wide guns and all breechloaders, use coarse-grained powder—Nos. 3 to 6. In moist weather use high-glazed powder. In wet or blowy weather set the top of your powder-flask half a drachm higher, and equally increase your powder in breech-loaders. In rainy weather do not shoot at all. *Decrease* your charge of powder with

mascus" over "Laminated Steel" appeared in *The Field* newspaper about ten years ago. It was to the effect that at the time when many muzzle-loaders were converted to breech-loaders, in process of which the law demands that they be submitted to the lighter or "definitive" proof, it was found that the number of Laminated that gave way, during this very moderate ordeal, was out of all proportion greater than of Damascus barrels. I recollect publishing a letter in *The Field* at the time, attributing this remarkable fact to the galvanic action set up by the foreign matter too frequently to be found between the laminæ. No attempt to my knowledge was made to controvert this theory, which was most probably the correct solution of the mystery. This may also account for accidents in frosty weather, the parts weakened by galvanic action then giving way.

heavy shot, such as 1, 2, or 3; and *increase* the quantity of lead. In *Express shot guns*, increase your powder and decrease your lead for wild game and distant shots, up to 4 drachms and down to $\frac{3}{4}$ oz.! This may startle you, but it is right.

A very frequent confusion of apothecaries' with imperial avoirdupois weight leads to great mistakes in the charge of gunpowder. In commerce, now-a-days, the word "drachm" is never used except as representing *one-eighth* of the avoirdupois ounce, with perhaps the exception of when weighing silk. But the drachm of gunpowder, with sportsmen, is *one-sixteenth* of an ounce. Making allowance for the difference between the two above varieties of weights, the sportsman's drachm is actually still less than *one-half* of the other. In exact terms—of troy grains, there are in the sportsman's drachm 27·34375, or, as near as may be, $27\frac{1}{3}$ grains. But in the apothecaries' weight there are no less than 60 troy grains in the drachm. In the confusion arising from the above, many sportsmen apply to a pharmaceutical chemist to weigh them out an exact drachm of powder, so as to adjust their charges; and the necessity for these differences being properly understood is well known to sportsmen of experience and editors of sporting periodicals. Gunpowder is seldom *weighed* for ascertaining the exact charge for a gun, but *measured* in standard instruments, which may be purchased for a few shillings of any gunmaker. These measures are not always to be fully relied on, and should be tested for exact experiments. The ounce of shot is the common avoirdupois ounce of commerce;

but the little instrument just mentioned should give, by measure, the exact weight of shot as well as of powder.[6]

Place your wadding firmly over the powder, more slackly over the shot. Use tight wadding for a weak-shooting gun, and slacker and thinner wadding for one which scatters. This applies to breech-loaders as well.

Never start immediately after breakfast, unless you have to drive to your ground. Active exercise, within less than an hour after the morning meal, will cost you two hours in the afternoon.

In the centre of your shootings, keep a piece of ground undisturbed as a refuge for game. Never beat this, and your stock of game will be maintained.

In all kinds of shooting over dogs, attend to your dogs. Never keep the eye long off them, and trust to them in all cases of doubt, following up a trustworthy animal to the most unlikely places. Always serve a pointing dog. The

[6] In writing so exactly of these details I am sometimes struck by the thought that, of how little importance they are when brought into comparison with the vast scale of creation. For instance, the Earth bears nearly exactly the same proportion to the Sun as one grain of No. 6 shot bears to *ten* of the 28lb. bags in which shot is made up for sale—the 270th of an ounce to 2¼ hundredweight! My subject seems dwarfed to utter insignificance. Yet the flight of the smallest bullet is governed by the same laws as that of the earth. A most wondrous and interesting recent discovery shows that even the rays of light have motive power, so that the diurnal revolution of the earth on its axis may be caused by these rays striking and driving from the sun the illumined half, and throwing of necessity the other or darkened half towards the east, there to receive the morning rays. Light would thus act upon our globe like the spiral grooves of a rifle upon the bullet.

man who keeps nearest his dogs will make the heaviest bag. Always prefer old dogs to young ones. Walk up quietly to points, and do not get flustered.

Hunt your widest ranging dogs in the forenoon over grouse ground. Slip about over a single steady old dog in the afternoon, among hollows and sheltered nooks. Give your dogs plenty of dry bedding. Carefully have them rubbed down in the evening. See to their feet for cuts and thorns. Give them animal food when hard wrought on the moors. Altogether, try to bring out their natural sagacity by encouraging and coaxing them, and use the lash as little as possible.

In taking aim keep the body well up, the head erect, the gun close to the shoulder, both eyes fixed on the object. You have already chosen a gun by trying it to the eye, but in shooting there must be no heed taken of the gun at all. *It* will come right to the eye, which is fully occupied with the object. The mere muscular action will be governed by the brain, simultaneously with the aim of the eye; the whole producing that correctness which we call "instinctive," for want of a better term. Read the words of my dear friend, Sheridan Knowles, in his *William Tell*—

> "Dost see the mark? Rivet your eye to it!
> There let it stick fast as the arrow would,
> Could you but send it there."

The poet is ever the true teacher. A good shot cannot tell how and why he kills.

At long ranges throw your line of sight in advance of

a crossing shot, and above one going right out. At long ranges, throw the head over the gun when the object goes to the right; keep the head straight when the object goes to the left; and keep the head most erect when the object goes right out. These three arrangements compensate for distance and speed, by a rule as certain in effect as the sight on a Minié rifle.

If suddenly overcome with fatigue on the moors, lie down on your back on dry heather, for half an hour, without moving. Drink cold tea, and avoid spirits as you would poison. Preserve your strength for the afternoon. In walking, allow your body to swing with the inequality of the ground, and you will lessen your toil by nearly one-half. In long heather or thick covert walk rather in-toed. If your feet become painful and threatened with blisters, shift your stockings, the right to the left, and *vice versa;* this will alter the points of pressure and relieve the skin. Wear thick woollen stockings.

In every kind of shooting, stick to its rules. For the sake of a heavy bag do not condescend to any mean manœuvre, which will spoil your dogs, lower the pleasure of your sport, and get you a name which may cost you many a pleasant invitation to shoot. The true end of shooting is its recreation. The game is but the object to induce exercise in its pursuit. Call on holders of adjoining ground and make pre-arrangements for following wounded game over the marches, &c. Instruct your gamekeepers to co-operate with their neighbours. Avoid injury to the farmers' crops and cattle. Vigilance, circumspection, and perseverance are the royal rules in shooting.

With two references to subjects which escaped notice in their proper places, I shall close the second part of this treatise.

I have been frequently asked by sportsmen for some data to guide them in judging the performances of fowling-pieces at targets, not only as to what a good gun should do, but also on the general question of whether or not actual improvement is being made with time. There is no statement more common than that gunsmiths are well aware that no improvement has been made since the days of Joseph Manton (say since 1825), and that they dare not claim any. I saw such language, only more bitterly worded, not long ago, in one of those acrimonious anonymous attacks upon undeniable advancement in which newspaper correspondents indulge, writers who imagine that victory rests with them solely because it is not worth while for respectable gunmakers to answer such unfounded assertions.

I know of no formal record of the capabilities of fowling-pieces which would enable me to give a continuous history of their advancement, but Johnson, an authoritative writer, whose book (bearing no date) internal evidence shows to have been written in or after 1835, gives the following as the highest results obtainable; and he takes pains to assert that any sportsman who "boasts" of higher performances by his gun, has come to an "inconsiderate conclusion." He even cautions his readers against "fraud" in those attempting to show higher results!

Target, 22 × 30 in.—Distance, 40 yds.—Shot No. 6, 270 = 1 oz.

An 18 gauge gun, with $2\frac{1}{4}$ drachms of powder, and 1 oz. of shot, should put on 60 pellets (less than one-fourth of whole charge). A 14 gauge gun, $2\frac{3}{4}$ drs. of powder, and $1\frac{1}{4}$ oz. of shot, 90 pellets (rather over one-fourth of whole charge). A 12 gauge gun, 3 drs. of powder, and $1\frac{3}{8}$ oz. of shot, 100 pellets (also rather over one-fourth of whole charge). In penetration, his highest expectations (please observe there being 24 sheets of paper only) are respectively 25, 30, and 40 pellets through the 24 sheets. I find similar statements by another author (date 1835): both writers prefer velocity to closer shooting, even with the then thin pattern. This was miserable work compared with recent achievements, and yet in the opinion of many most experienced sportsmen, when game has not been well killed at fair ranges during the present century, the fault has been "behind the trigger."

From 1844 to 1862 I devoted unusual pains to the art of boring barrels, and I certainly increased on the above to the extent of 40 per cent. I cannot give the improvement made by other leading gunsmiths, doubtless it was about the same, but my guns were famed as hard-hitters. Then came breech-loaders, and the shooting of first-class guns, 12 bore, ran from 120 to 140 pellets, with 3 drs. of powder, and $1\frac{1}{8}$ oz. of shot, extreme penetration expected being through 25 out of 40 sheets, an immense increase of power by the laws of action and reaction, operating on 40 sheets as against the slighter resistance of 24.

I have already stated, that this year my son, for the first time on record, repeatedly penetrated 40 sheets, and that with *soft* shot. This has been approached by one or

two others. The average of pellets on a 30-inch circular plate may now be estimated as very high when it reaches 180 to 185. Exceptional shots go still higher. On the day I write this I have had one shot of 228, and another of 233: bore 12, $1\frac{1}{8}$ oz., shot No. 6. I have for my present purpose taken twelve consecutive shots by another 12-bore breech-loader, and find the aggregate to be 2220 pellets, with $1\frac{1}{8}$ oz., No. 6 shot, *being nearly two-thirds of the whole charge!* It should be observed that, fortunately for comparison, a 30-inch circular, and a 22 × 30 oblong target are, as near as may be, of the same area. If a gun therefore place *with the new velocity* over 150 pellets out of $1\frac{1}{8}$ oz. No. 6 on a 30-inch circular plate, it will be thoroughly efficient in the field, excelling all former precedent. For special purposes, as ducks flying overhead, this can be exceeded. But a good gun for general game does not consist in its shooting too closely, which either misses entirely or cuts birds to pieces.

As I have never yet known an unpractised shot at targets able to show a gun's real shooting, however skilful he may be at game, and as I have equally observed that a sportsman shoots best in such cases at a smaller mark, another test of what guns once could do and do now, may be usefully given. I refer to the sheet of tin, as at page 107, both for general comparison and for practical testing. The best muzzle-loaders I ever saw, with $1\frac{1}{4}$ oz. No. 6, at 40 yards were expected to place 25 to 28 pellets on, with 15 to 18 through, the sheet. I now find that at 45 yards I can put 50 on, and 46 to 48 through; weight of sheet of tin $7\frac{1}{2}$ oz., dimensions 14 × 10 inches. The $1\frac{1}{8}$ oz. No.

6 soft shot is always to be understood now-a-days. This should satisfy the most sceptical on the improvement of guns.

Closer shooting may be attained by using hard shot, but I reiterate the strong advice to use soft shot only. Its greater momentum is priceless, and it combines flattening or expansion of the projectile on hitting. The area of the blow is the measure of killing power at all common game, from deer to snipe. The penetration of soft shot at all game is more than ample. To give the young sportsman a better conception of the value of heavy soft lead, I may mention that, as its expansion over that of hard shot has been proved to increase the diameter as 5 is to 4, this would not give one-fourth or one-fifth more killing power only, but about *two-thirds more as measured by area.* That is, the extra fifth in diameter is about equal to $\frac{2}{3}$ extra in area, probably doubling the shock; a fact that seems to have escaped the notice of even those who properly advocate the use of soft shot, and who have therefore understated their case.[7]

The other subject I desire to make mention of, is a most remarkable bullet, the invention of Lord Keane. It is meant for use in "Express" rifles, when fired at large and ferocious animals. The effects upon any mass, such as clay, or a large number of sheets of thick brown paper, are

[7] Just as this sheet is being passed through the press, my attention has been drawn by a Lancashire sportsman to the disagreeableness of meeting with hard shot while eating game, to the danger of probably breaking one's teeth. This had never struck me; but by request I give the fact this publicity. My informant speaks from actual experience in his own family.

terrific. Entering by a small orifice, such as a buck-shot might be supposed to make, it literally excavates a conical-shaped cavern within, while its greater weight, combined with its velocity, would smash any bone it might meet. The result is gained by an ingenious arrangement in the casting. The illustration purposely leaves the rear part of the bullet more perfect than it actually would be on being dug out of clay, so as to show its original diameter (·500). Here is a virtually solid ball, with the velocity of a narrow, and the killing area of a wide bore, all in one!

THE ART OF SHOOTING.

Part III. Its Purpose.

HAVING now, so far as I have been able, instructed the young sportsman in the Appliances and Practice of the Art of Shooting, I enter, not unreluctantly, on the final and very different branch of this work—its Purpose. The appliances and practice are technical and customary. They admit of no objections, save upon modifications arising from differences in opinion or experience. The subjects are taken as things of course, and any argumentation must be on minor matters. But when we enter upon the purpose, we are met by a host of talent, which of recent years has set itself to denounce all field sports as immoral and degrading. The question arises, What need is there, in a work of this nature, intended to instruct sportsmen, who, of all men, do not challenge the innocence of their recreation, to go into the moral question at all? Certainly, were I to consult my own ease and immunity from future retort, I would stick to my last—to guns and how to use them, and leave all moral discussion to others. But having naturally thought over the subject, and being one who holds that it is the

duty of every man to honestly and fearlessly advocate what he believes to be right, I venture to give the following remarks. I view the whole question from this standpoint, that, where things innocent in themselves are mixed up with things hurtful and denounced accordingly, there is no end to the mischief that may ensue. To condemn things good on false arguments appears to me to be quite as mischievous as to praise things wicked. Right and wrong are confounded. When men of high repute, leaders of thought, set themselves, through ignorance or caprice, to unjustly condemn, they also weaken their whole influence in praising that which is undeniably good.

Satirists abound in every age. The imperfect moral arrangements of this world—perhaps one of the greatest natural proofs of a higher future state of existence—furnish such writers with endless themes. These themes vary with time. We live in a period of overdue stimulation of the intellect, to the prejudice of physical development, at one period; at another the direction of the pressure is reversed. Those of my readers who are conversant with what are termed the Classical Essayists of the eighteenth century, must recollect how the shafts of satire were almost invariably levelled against the visiting London and the adoption of town manners—in plain terms, of greater refinement—by country gentlemen and their wives and daughters. These were counselled to stay at home and follow their rural pursuits and occupations. They were even assailed for introducing London manners into their country houses. Yet every

one knows that intellectualism and progress of civilization are the products of city life. The current runs the other way at present, but the twentieth century may see another turn of the wheel, and satire employed to promote field sports, and undo the mischief created by the advocacy of undue intellectualism, if an existing school of writers succeed in well-meant but mistaken efforts.

It would be a comparatively easy matter to write a schoolboy essay on the use and advantages of exercise. All thinking men agree that exercise is a condition of health. What is disputed so keenly of late is the lawfulness of that exercise, as involving cruelty to the lower animals, when it takes the form of field sports. The controversy has been carried on, on one side, with all the force and skill of practised logicians, laying down the principles entirely so as to suit their own convenience, and also, as it appears to me, purposely confounding the meaning of words which are really widely differing; and, on the other side, with vague general answers, as, for instance, that fox-hunting brings beneficially the different classes of society together, and improves the breed of horses. In a similar spirit, but with the gayer badinage of his countrymen, when a philosopher gravely asked a French sportsman if he believed it to be lawful for Man to kill a partridge, the latter replied, "Of course, in the shooting season, and with my game certificate in my pocket." "But, seriously," says the philosopher, "granting these conditions, is Man justified in killing a bird made by the Creator?" "To be sure," replies the sportsman, "if

Man also eat it." "You believe, then, that Man may fearlessly eat a partridge?" "I do, most undoubtedly, if it be properly cooked, with the sauce in perfection!"

It would be quite safe to leave the whole question to the good sense and experience of men in general, and not of transcendentalists only, who are not content with the plain laws of Nature, were it not that the arguments of the latter may work much harm. It is from this reason that I regret that the answers made by sportsmen—some of these having distinguished themselves in literature, and therefore being well able to discuss gravely—should be merely defensive and half apologetic. For any more serious reply to fall into such hands as mine—to the pen of one who may be thought to view the whole question from a professional and selfish standpoint—may be deplored. But my profession has only caused me, from the gravest of reasons, to investigate the matter the more deeply and earnestly, and I yield to no sentimentalist in the abhorrence of cruelty. I can add, that I have mixed with sportsmen from boyhood, and that I have specially noted their peculiar tenderness for, and care of, all domestic animals, and their avoidance of all cruelty in the field. There can be, therefore, nothing in field sports which hardens the heart or petrifies the feelings as time goes on, for this care and tenderness I have observed to increase with age. To denounce, and to seem to prove to be vicious, things innocent and lawful, cannot fail to confound vice and virtue, and those who attack the morality of field sports would do well to consider where their arguments are to stop. To those who will judge

dispassionately, I think it can be shown that the pursuit of field sports is in strict accordance with the nature and requirements of mankind, and infringes no moral law whatsoever. The basis of the question seems to me to rest upon the necessity of LABOUR—on that sweat of the face by which man eats bread, and which is a necessity to his healthy existence in his twofold state, physical and mental. If we accept the general theory that mankind pass through various stages—the hunting, the pastoral, the agricultural, and the commercial—it would strengthen the writers who assail field sports if they would define the points where human nature is to change, or ever did change, so that men could divest themselves of part of their inherent qualities. Or, to put it otherwise, they may also be called on to prove if in the early stages of man's history the commercial quality was not latent, and in the most recent stages if the hunting has been, or can be, extinguished. My assertion is, that man's nature is alike through all ages—may be modified, but can have no one quality obliterated.

Exactly, then, as the commercial quality always existed more or less, first manifesting itself in the rudest forms of barter, so the hunting quality, now that the chase is no longer the direct means of supporting life in civilized communities, still does exist, and cannot be obliterated. Man is essentially the same being throughout, and cannot possibly divest himself of any one of his attributes. If we do not accept the fact of the progressive stages as given above, the case for my opponents is not improved; for we must then take man as we now

find him—a compound of the hunter, the shepherd, the tiller of the ground, and the merchant. The qualities of all these exist in every human breast. It has been humorously but truly said, that were a little rat to run across the London Exchange, the traffic in millions sterling would be suspended for its pursuit, and every reader of history knows that in those dread and supreme moments when vast armies have been traversing the short space which intervened between their meeting in deadly conflict, the chase of a miserable hare has for a time deferred, on more than one occasion, the clash of arms. Such an occurrence happened even so lately as at one of the first battles of the Franco-German war of 1870. The instinct of the hunter predominated over the discipline of the warrior, and grim soldiers broke those ranks which death itself could only cause them to close up more solidly as another and another comrade fell. Is there under the sun one nation where a similar passion for the chase does not exist in some form or other, and have we not the authority of Cicero for the assertion, that "in everything the consent of all nations is to be accounted the law of Nature, and to resist it is to resist the voice of God"? The wisdom of planting this instinct irrevocably in the human breast seems more and more clearly displayed the deeper we investigate the subject.

The ease with which any human institutions, customs, or pursuits may be assailed and plausibly condemned in their entirety from some peculiar standpoint has seldom had a more complete illustration than in controversies on field sports. Not only are the arguments against these

strained to the most unfair tension, but the attacks upon their morality are invariably conducted with a departure from the very first principles of discussion, resulting either from prejudice or from great ignorance of the subject. In either case, those who assail the morality of field sports are incompetent to discuss the question fairly. If, on the other hand, they assert that they are masters of the subject, that they have studied it impartially in all its parts, and have really done so, then they may be accused of wilful disregard of fair representation of the case, of suppression of truth, and of confounding under one title pursuits and practices so widely differing in character as by no just reason whatever to come under the same category. These pursuits and practices cannot be arraigned under one and the same indictment, if, indeed, one class of them, and that the one really concerned, can be arraigned under any moral indictment whatever. It is an easy matter for a practised controversialist to take up a question and appear to the general reader to carry his point, by a total disregard of common dialectics, through prejudice or ignorance; and this is all the more easy in the present case, from this reason, that the question is almost invariably raised by those who—in all probability having no experience of them whatever—condemn field sports as immoral and cruel. There is, therefore, ample opportunity afforded to those taking the initiative to choose their mode of attack, and to lay down certain convenient premisses. With the ninety-nine readers out of a hundred who are satisfied with the laying down or assertion of certain principles, without taking

the trouble to test their genuineness, these premisses have all the weight of proof. These ninety-nine prefer studying by deputy, and estimate assertions less by their intrinsic value than by the faith they have in, or by the general reputation of, the writers so asserting. Words, although only the vehicle of ideas or truths, are with the less thoughtful truths themselves, and in this discussion have been made to do double duty, in conveying to the mind of the reader a general and comprehensive conviction of the immorality of field sports founded upon the cruelty involved in some practices which are not field sports at all, differing from the latter not only in essence but in nomenclature, and I can scarcely conceive any graver charge to be brought against public writers than the wilful confounding of separate things under the same verbal designation. The practice of a thing they may not understand, but the title of a thing is the very first element in the discussion, else no amount of learning, no liking or disliking, no conscientiousness nor desire to perform a supposed duty, will compensate the evil done to public morality in a much greater degree by confounding words or different things represented by the same words. Truth requires no factitious bolstering, and if a disputant, eager to gain a momentary victory, however conscientiously and with laudable purpose, depart from the real basis of truth, his superstructure of argumentation must fall all the more heavily in the end. Even the best cause will be injured by such a proceeding. Not only have the assailants of the morality of field sports, as it seems to me, argued unfairly, but there is a certain assumption of

personal moral superiority on their part which, by the very nature of things, unfairly reinforces their position. They at once get all the "good" people on their side. On the principle that where there is a doubt in morals, safety lies in entire abnegation, so in this question many readers will be content with the conclusion, that in so doubtful a case as is represented, field sports had better be left alone altogether, and a higher standard of morality thus be assuredly maintained, without reflecting that the whole position may be reversed and the assailants become the assailed. To stand solely on the defensive is nearly tantamount to an admission of being in the wrong; to take higher ground is the purpose of this essay. It may be, and admittedly is, generous and good to protect the lower animals. The old adage tells us that "the merciful man is merciful to his beast." But has Man no claims on generosity and goodness? Has he no evils to be protected against? In that mysterious composite nature, in which he is so fearfully and wonderfully made, are there not certain instincts, certain innate qualities or tendencies, wisely implanted for the protection of his life and the vigorous maintenance of his race? Can he be intellectual and all intellectual, or physical and all physical? Has he a tendency to become either, to the destruction of the other nature, and either being eliminated, what will then be his value and adaptation to the duties of life? Can he drive out any essential part of his nature with impunity, not only to himself, but to his offspring? These are serious questions; not lightly to be answered. *Ne furcâ naturam expellas.*

The preliminary objection to that mode of reasoning to which I desire to reply is verbal. *In limine* I object to and protest against the word "amusement" being applied to designate field sports. This misapplication of a term lies at the very threshold of the discussion, is quite unwarrantable, all the more that the chief of these assailants is the most fastidious and distinguished "Purist" (one excessively nice in the choice of words) of the present age! It leads the mind up to most erroneous conclusions. The verb "amuse," with all its derivatives, conveys solely those pleasurable sensations which may be enjoyed while we are in a state of repose. It is derived from "*muser*," the French to "loiter" or "trifle." *Muser* is from the Italian "*musare*," to stand idle, and in other languages, ancient and modern, with little variation in form, it bears the same meaning, and conveys "inaction." In no language known to me, does it or any word used as its equivalent, represent field sports. These, as a rule, are termed "the chase," or its equivalent. It is essentially opposed to action, which is the very essence of field sports. It may be possible to take amusement in the field that may involve the capture or death of lower animals, but it by no means follows that such amusement is any branch of field sports. One has a right to demand clear and definite terms in defending an assailed position. The challenged has even more—a right to the choice of weapons. But no concessions are required when I assert that, by the use of the word "amusement," the whole question is misrepresented. Some years ago, during a Saturday afternoon ramble, I

chanced upon an individual busily engaged in arranging nets for the capture of larks and other small birds. This was on the Continent; and on entering into conversation with the *oiseleur*, he was so good as to inform me that he was making arrangements "*pour m'amuser demain, monsieur*." Here was the true expression, probably all the more correct that, as I afterwards learned, the man was an able schoolmaster, who knew better than to use, in speaking of his paltry purpose, any equivalent to the words "Field Sports;" and this is all the more noticeable that the term "*la chasse*" comprehends the pursuit or taking of the smaller animals, not usually followed by British sportsmen. To work his nets the schoolmaster, as he showed me, would lie in a dry ditch at the back of a hedge, holding in his hand the end of a stout cord of some forty yards in length, by pulling which the nets enveloped any unfortunate birds which might be enticed by his "decoy-birds" within the fatal precincts. It might be a very wrong way to spend the Sunday. Tell it not in Fife, publish it not in the streets of Glasgow! But the poor pedagogue at least was honest in his phraseology, and his example so far is worthy of imitation.

The word "sport," on the other hand, has a most comprehensive, indeed a most extraordinary range in meaning. It is cause, it is effect; it is fun, humour, raising pleasurable emotions; and it is these very emotions so raised. There is hardly any limit to its range, as applied to anything that lawfully exercises the body and mind or unlawfully excites the passions and gratifies evil propensities. Hence, without proper qualification, this word

"sport" may be, and daily is sadly abused, as are its derivatives. The simple moralist who is led by words or terms, not by facts or real knowledge, knows little or no difference between a "sportsman" and a "sporting-man," and yet it would be difficult to find in their pure and actual meaning two words conveying characteristics more opposed to each other. It is "sport," during hours of untold toil, to seek the stag in his almost inaccessible mountain haunts; it is "sport" to witness rats worried by a bull-terrier; and the ruffianly possessor of a penny gambling-table at a village fair incessantly bawls, 'Now's your time, gentlemen sportsmen; make your game while the ball's a-rollin'." This confusion of things signified has a disastrous effect on the proper understanding of this question, but it is taking a very unfair advantage indeed for practised dialecticians not to make a most guarded distinction between the true and the false as applied to pursuits and practices so widely different yet condemned under one category.

To distinguish the true from the false it is customary to prefix the word "field" to "sports," and, so far as this mere prefix goes, no fault can be found with those who write in condemnation of the thing signified. They use the term frankly so far as mere phraseology goes (but then go on to argue on other so-called "sports"), and the question comes to be asked, Why do these writers stop short here? If they are competent, by fair and impartial inquiry, to assume a moral superiority and condemn field sports, why will they insist on immorally identifying them, in argument at least, with practices of the most cruel

and indefensible character, which they must of necessity know are not carried out in the "field," meaning by that term the scope and scene of the genuine and lawful pursuits? To worry a cat, to bait a bull, to draw a badger, are monstrous cruelties, yet the first seems, from the frequency with which it is brought into play to be the grand *pièce d'artillerie* in attacking field sports, by its painful reiteration as being the equivalent of fox-hunting. If these writers insist on using the general term "amusement" wrongly, let them continue to do so to their own satisfaction—and, I may add, stupefaction—but they have no manner of right (and this all the more that they assume so great a moral superiority) to use a vague and general term, to the misleading of the reader, in discussing matters which, to arrive at truth, must be separated so widely as vicious practices dignified with the name of "sport," and lawful pursuits distinguished by the specific title of "Field Sports."

As the word "amusement," in its true meaning, and as affecting this controversy, is the embodiment of "inaction," so the word "chase," which may be said to comprehend all field sports, is the embodiment of "action." Herein lies the great distinction between the true and the false; a true distinction, sound in its principle and application. The broad rule may be laid down, and I challenge all honest attempt to deny its correctness, that, in all genuine field sports the persons engaged are participators in the hunt, chase, call it what you will, and voluntarily subject themselves to severe toil. "Hawking and Hunting," says old Butler in his *Anatomy of*

Melancholy, "are very laborious." Deer-stalking, so keenly followed, if once practised, while opportunity, life, and strength remain, demands indescribable exertions; and I know not a more severe and maintained strain upon the muscular and vital energies than grouse shooting during warm weather, or over rough ground in any weather. There may be, and are, modifications of this voluntary labour. Angling, for instance, ranges from toilsome salmon-fishing to sitting in and watching a float from a punt, and may be termed the link between the active chase and inactive amusement, with this saving clause in favour of the morality of its lower phase, that the person enjoying it is himself the actual agent.[1] We may therefore lay it down as absolute, that true field sports may be invariably distinguished from the falsely so called by the latter being carried out vicariously. In these the "sportsmen," Heaven save the mark! are mere spectators, generally gratifying, more or less, brutal propensities, and in all probability staking sums of money on certain contingencies. The active agents are the men or dogs, that within a confined space are fighting fiercely with each other, as in dog-fighting or pugilism, or are killing or torturing the rat, the cat, the bull, or the bear. It is this vicariousness that causes, notwithstanding all their picturesqueness, Spanish bullfights to be so deplored. In the much dwelt upon cat-worrying, there is no parallel, even should it not occur in such confined space, for a cat does not

[1] In his amusing letters of a "Besieged Resident," Mr. Labouchere applies the word "chase" to angling for gudgeon in the Seine, during the siege of Paris in 1870-71.

run any distance before a dog, but either stands at bay or takes refuge in the nearest coign of vantage, while a fox, to which the cat is likened, puts his trust in cunning and speed of foot, in the greater number of instances baffling his pursuers. It is astonishing to me, who have long studied this question carefully, conscientiously, and impartially, and who will yield to none in detestation of all forms of cruelty, to find how systematically the above distinction has been ignored by those who take the opposite side. They have but to consider any branch of field sports, whether involving or not the pursuit or death of any of the lower animals, to see this distinction staring them in the face. Whether in the properly so-called field sports, or in the *quasi*, as foot-ball, cricket, the Scottish game of "shinty," rowing, skating, and so on, Action, Action, Action, as Demosthenes said of oratory, is the life and essence. Are we to believe that this systematic ignoring of distinctive principles is purely unintentional, and that there is no desire to take every advantage, probably enough from the warmth of supposed humanity, by classing the false and the true under one heading of "Popular amusements"? We may honour the intention, but not the conduct of the argument. I repudiate entirely the application of one term to things so widely differing, and am astounded at the daring which came to apply it. The first step in such a discussion, from either side, should be to honestly describe and discriminate between the things discussed. This being done, let these be fairly treated on their several merits. If field sports, properly so called, are wrong, let it be shown

how and why, but do not condemn them on false grounds. Do not condemn fox-hunting, bull-baiting, and gladiatorial fights as being "all equally acts of cruelty," differing only in degree (although I must acknowledge this is too finely casuistical for my discriminative faculties; I can admit no stretch of conscience in discussing pure abstract morality), without honestly and impartially inquiring whether or not there may be some good and genuine reasons why fox-hunting should not be brought for one moment into parallelism with bull-baiting, or the fights of gladiators. The proof of the identity of all three must precede the general condemnation, and I assert that the identification is impossible. It is with a view to this unjustly desired identification that the term "amusement" is unwarrantably used, and must be repudiated by every impartial controversialist.

And since the word "cruelty" occurs here, let me state that there is nothing more easy than to raise the cry of cruelty without consideration. I only write in a general sense, but desire that the reader should view the subject with clear comprehension. I offer an illustration, not an argument. Cruelty is often asserted to be inflicted through sheer sentimentalism. Pure benevolence is an impossibility in morals. Even of the Divinity, in matters as high above this question as light is superior to darkness, it has been said, "a God all mercy is a God unjust." But, without soaring into regions beyond the scope of this discussion, it may be briefly stated that the mere maintenance of just rights is often stigmatized as cruelty. The cases of landlord and tenant, of creditor and

debtor, may be instanced, as being most familiar. We often hear of the cruel landlord, rarely of the cruel tenant, on whose due payment of rent may depend the food of the landlord's children. The debtor is, with sentimentalists, always the virtuous victim; the creditor the cruel oppressor; yet there can be nothing more clear than that, unless the incurring of debt involve the supposed ability, and the undoubted willingness to pay, there must be a going back to a ruder state of general society, and an end to all extended commerce and consequent civilizing of the world, through the destruction of credit, which is the life and soul of commerce. Credit would cease to be given so soon as the just right to enforce payment should cease, yet this enforcement sentimentalists call cruelty.

In like manner every case of the destruction of the life of lower animals, save and except for food or clothing, is branded as cruelty, without regard to contingencies. It matters not to most sentimentalists whether or not the food and clothing may be demanded in unnecessary quantities or qualities, with the consequent unnecessarily increased destruction of animal life; for these purposes all is right and proper. But let the life of an inferior animal be taken under circumstances highly conducive to the welfare of man, although not in the tangible and material forms of food and clothing, and an outcry is at once raised on the score of inhumanity. It may startle those who raise such an outcry to be asked if it can be proved that the Creator purposes that any one individual of the lower animals is intended for a natural death through

old age.[2] All facts point to the contrary, and there is nothing more painful, in the whole range of animal nature, than the happily rare and exceptional death-scenes of worn-out brutes. Moribund lions and bisons have ere now melted the hearts of travellers and sportsmen, and the descriptions of such scenes are painfully affecting to readers of even average sensibility. The fact seems to be, that as the Scriptures put it, man has "dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." The wondrous wisdom of this arrangement is at once apparent when we consider that, without it, it would be impossible to define the limits of man's absolute right to utilize in any form the brute creation. If endless discussion arise

[2] In the whole range of observations on natural history there is nothing more remarkable than that made by a recent traveller of undoubted truthfulness. The author has mislaid the verbatim extract made for his present purpose, so that he cannot do the traveller the justice of naming him and the title of his book, but the facts are here correctly given. In the northern countries of Europe, when the storks, after the breeding season, prepare to migrate southwards as winter approaches, they make flights to test the capabilities of the young birds to accomplish the coming journey. When any one is found not to possess the requisite strength, it is deliberately put to death by the others! As storks principally feed on frogs, which are not to be found in winter through retreating to inaccessible places, these weak birds, if left behind, would inevitably die of hunger. What an admirable instinct is this which commands the older birds to save the weaklings from future sufferings by an instantaneous death! The proof of Divine arrangement is clearly made manifest; indeed no reflective mind can consider the above fact without admiration of that All-governing Power which thus endows even storks with prescience, and makes them "cruel only to be kind."

even now, what would be the state of matters had this arrangement not been made? As it is, cruelty can only be charged when there is wanton torture, and this cannot be fairly charged against the practice of any legitimate field sport. Besides, it would, as I say, be so impossible to define man's prerogative, that the use of domestic animals for any recreation whatever would be an endless question of morality. In such a position the researches of naturalists, the recreation of the multitude, the innocent amusement of countless invalids, must be foregone. Is the pain inflicted by the rapid pursuit of a hare or a fox, terminating in escape or instantaneous death, for one moment to be compared to the prolonged feverish torture of the restless carnivora confined in zoological collections and menageries? Is the horse always willing to be saddled? Is there any mode of learning the present state of his internal economy when he is being harnessed, or of his fitness for exertion there and then? Must I send my parrot back to Africa, and return my bullfinch to his native groves? Until these questions are satisfactorily answered we are entitled to assume that, while abstract benevolence must necessarily condemn all use of the lower animals to which, had they the power, they would refuse consent, the present condition of things, and the arrangements of Providence, entitle us to treat the whole question as one to be governed by reason and utility rather than by a useless and sentimental humanitarianism. It was diseased activity of conscientiousness—morbidly weighing things, not as they are, but as they might be, in a state of pure benevolence—

drove Shelley to vegetarianism and atheism. In this question the hard Benthamite doctrine of the greatest amount of good being the rule for guidance may be fairly urged. I dislike the word "expediency," but, bearing in mind that I am now offering illustrations on the general question of cruelty, not specific arguments in favour of field sports, I think that Paley's doctrine of expediency is also singularly applicable. In the debtor and creditor argument, the question is not to what purpose the latter intends to devote the money recovered. It may be for the purposes of food and clothing—it may be for the expenses of a pleasurable journey—it may be for a questionable gratification. No sentimentalist assails the right of recovery solely under the plea of possible misapplication of the sum recovered. Yet sportsmen are assailed on the score of cruelty if the object of their pursuit do not furnish food or clothing, although that pursuit most undeniably affords hygienic benefits as valuable as either to the physical frame, and still more valuable to the intellectual well-being.

The abuse of terms, the confounding of things lawful and things unlawful, are not merely negatively wrong: they are positively mischievous, and may do more harm to morals in one year than field sports, even when they are carried to a blameworthy excess, can in ten. There is nothing more certain than that everything done or promulgated by the upper or authoritative classes is keenly scrutinized by the inferior either in years or position—keenly for good, still more keenly for evil. The latter is unfortunately the more easily followed or imitated. That

moralist must indeed have had little association with those whom it is the fashion to call the "working classes" who is not cognizant of the wondrous acuteness of their reasoning faculties on all things personal or comparative. The young of all classes possess this acuteness in a somewhat less degree, but with still greater imitativeness. Neither of these may reason correctly on the essence of a question, but on its accidents they are intuitively sharp. Thus, they will quickly catch at the alleged identity, or parallelism, of fox-hunting and cat-worrying, without going further into the inquiry. What grave responsibility, then, does not a public writer incur who lends the weight of his great general reputation to assert this parallelism? Does he reflect upon the plain result of his argumentation, that, if he condemns fox-hunting (the lawfulness of which may be honestly defended) by the light of cat-worrying, he raises to the same degree of lawfulness, as being a question at least to be argued, cat-worrying, which in reality cannot be argued at all, but is a thing to be loathed and execrated? There is something catching, to the young especially, in the word "sportsman;" but how is a youth to distinguish between what is genuine and what is spurious, if older and wiser men class these together?

Not only are those immediately concerned unduly and mischievously influenced by the abuse of terms, but this also operates indirectly upon society generally. Parents, guardians, friends, neighbours, so influenced, look askance upon the genuine youthful sportsman as one following evil courses. It is clear to his own conscience that

the chase has never prompted an unclean thought or pampered an evil predilection, never given any offence to his neighbour; with all this, the inevitable consequences arising from being suspected of evil must follow. The social bond cannot be broken from either side without mischief. If a man is scowled at, he will be more than man if he scowl not in return. If the good avoid him, he will avoid the good. Let the good, then, well assure themselves that they are in the right, lest they do a grievous wrong, and place themselves in the position of those originators of sin who are more to be reprobated than sinners.

Journalists are peculiarly liable to be influenced by this confusion of terms—I mean those journalists, *littérateurs*, who are called upon by the exigencies of their profession to write upon all manner of subjects, and treat these subjects in accordance with the views of their organ, honestly enough professionally, but without much concern as to the actual merits of a question when viewed dispassionately, and freed from the inevitable bias of the journal written for. There was a class of journals where, in juxta-columns, were to be read the records of pugilism and idylls upon angling pure as from the pen of Izaak Walton. There is another class of journals, to whom all field sports are Anathema Maranatha! I have seen, within a recent period, an able and laudable article upon pugilism, published in a first-class American magazine, in which, with the best intentions, the writer states that his purpose is to give the history of "the rise, decline, and fall of this branch of FIELD SPORTS in the

United States!" Still more recently, I have read a leading article in a London weekly paper of large circulation, denouncing in unmeasured terms the loss of hundreds of thousands of acres of valuable "wheat land" (fact) now devoted to the brutal sport of—grouse shooting!! Does any rational man believe that the writer of that article drew his inspiration from personal belief founded on knowledge, and not from unfounded belief through trusting to the general denunciation of field sports by certain leaders of public opinion? These latter may know when to stop, but their followers and imitators "better their instructions," and spice their articles to suit the palate of their readers, regardlessly of the evil effects necessarily arising from the propagation of untruth. They are indeed the less to blame, in that they take for granted what has not been proved, and, on the principle given above, that safety in morals lies in abnegation, so satisfy their conscience. The primary misleading lies in the general high reputation of those writers whom journalists blindly follow. But what mischief is not created by setting class against class, not to speak of that injury or hindrance done to the redressing of real by the creation of false grievances. In many instances the ignorance of journalists takes a ludicrous turn. Some years ago there appeared in the Twelfth of August impression of a daily paper of eminence a paragraph to this effect (I quote from memory, but the words, if not their arrangement, are correct):—"By the time this morning's paper is in the hands of our readers, the horns of the hunters will have been heard on a thousand hills, and many a gallant

heath-cock, after an animated chase, will have stained the heather with his crimson blood," and so on. The thing was so exquisitely tickling to my fancy, that I followed it up by sending to the paper a still more spicy paragraph, describing the horses, the red-coats of the hunters, down to their spurs, with the hounds in full cry. The editor, however, could not swallow that; he drew the line at the horns of chase, and had the acumen not to insert the paragraph.

As leading up to the few remarks I shall make on the positive side of the question, I quote the following from the autobiography of Benvenuto Cellini:—

"About this time, whilst I was still a young man of three-and-twenty, so dreadful an epidemic disease prevailed in Rome that there died every day several thousands. Though I was somewhat terrified at this calamity, I began to indulge myself in certain pleasures of fancy arising from different causes, which I shall hereafter specify; for on holidays I amused myself with visiting the antiquities of that city, and sometimes took their figures in wax, at other times I made drawings of them. As these antiquities are all ruinous edifices, where a number of pigeons build their nests, I had a mind to divert myself among them with my fowling-piece; but being greatly afraid of the plague, I avoided all commerce with the inhabitants, and made Paulino carry my gun: thus we repaired together to the ruins, from whence I often returned home loaded with pigeons of the largest size. But I never chose to put more than a single ball into my piece, and in this manner, by being a good marksman, I procured a considerable quantity of game. The fowling-piece which I held in my hand was, both on the inside and outside, as bright as a looking-glass. I likewise made the powder as fine as the

minutest dust; and in the use of it I discovered some of the most admirable secrets that ever were known till this time. Of this I will, to avoid prolixity, give only one proof, which will surprise even those who are adepts in this matter. When I had charged my piece with a quantity of powder, equal in weight to the fifth part of a ball, it carried 200 paces point-blank. In a word, so great was the delight I took in shooting, that it often diverted me from the business of my shops. Though it had this ill-consequence, it in other respects procured me considerable advantages; for, by this exercise of shooting, I greatly improved my constitution; the air was of vast service to me, and braced my nerves, which were naturally relaxed. *Whilst I was enjoying these pleasures my spirits suddenly revived. I no longer had my usual gloom, and I worked to more purpose than when my attention was totally engrossed by business; upon the whole, my gun turned rather to my advantage than the contrary.*

In the above remarkable passage lies the marrow of the whole matter, and the curious reader will also observe with interest that Cellini, with all that force of character which marked the man, went deeply into the "most admirable secrets" in the use of gunpowder, and practically anticipated the point-blank range of modern rifles by over three centuries. Now if ever any one lived who might be supposed, through love of his art, vanity, and other incentives to exertion, to be above or beyond the requiring of field-sports to brace his nerves and restore his jaded spirits, it is the immortal sculptor of the Perseus. The world may never know how much it is indebted for those gems of art which make Cellini's name tower above that of any other competitor—rival he has none—to the "exercise of shooting" described above. Had he plodded

on, minded solely the business of his employers—of his "shops," as he modestly terms them—he might have produced a great number of mediocrities, and there an end!

What then do men shoot for, what is the purpose? The answer is, that the very foundation of all intellectual advancement—maintained exertion of the thinking faculties—as well as the concomitants of high civilization, such as more luxuriant living, the congregating for much of our time in confined spaces, as must be in all city life, commercial, legal, or legislative, and the non-necessity of actual daily labour by the possessors of acquired or hereditary capital (for all wealth is originally founded on labour of some kind or other) demand some counterpoise to balance our constitutional equilibrium. It may be asked why not take exercise without following a field-sport? The reply is clear:—the more we exercise our intellect the less we are inclined or able to exercise our body in equal degree without a stimulus to exertion, and that stimulus the chase supplies. Cellini could have taken a walk, but "this exercise of shooting" would have been wanting, and so it is now. Put a gun into the hands of a man who may not walk five miles along a highway with ease, and the difficulty will be, not to get him to walk five, but to restrain him from walking twenty. Just then as there has been a severe strain on the mental, and a neglect of the physical, powers, so there is now brought into action a reversed process. The mind goes into abeyance; the body comes into play; the deep reasoner, the fagged merchant, the speculative philosopher, disappears; the latent hunter asserts his preroga-

tive. Men therefore are enabled to rapidly compensate for their previous enforced physical inaction, go back to a state of nature and the toils of the primitive hunter for a time, and yet not break in unduly or for too long a period upon the exercise of their highest intellectual faculties. I think I am safe in asserting that the highest order of thought is incompatible with sufficient daily bodily exercise. To attain high development the intellect must entirely predominate for a time. In like manner must not only the thinker, the lawyer, the statesman, but also the merchant, the manufacturer, and in a word, the man of business of any kind in these days, give up his whole mind to his profession to keep pace with his competitors, and periodically seek for recreation in an entire holiday. Men do not shoot or follow other field-sports with all this philosophically arranged in their intentions, but they follow an unerring instinct, which leads them to perform acts in conformity with the requirement of natural laws. They do not need to reason out these laws to their ultimate purpose in order to obey them. The law is there, and abides; the Creator has arranged the final results. The Duke of Argyll, in an admirable article "On Animal Instinct" (*The Contemporary Review*, July, 1875), has put this very clearly. "All our trust and confidence in the results of reasoning must depend on our trust and confidence in the adjusted harmony which has been established between instinct and the truths of Nature. . . . . We see it to be a great law prevailing in the instincts of the lower animals, and in our own, that they are true not only as guiding the

animal rightly to the satisfaction of whatever appetite is immediately concerned, but true also as ministering to ends of which the animal knows nothing, although they are ends of the highest importance, both in its own economy and in the far-off economies of creation. In direct proportion as our own minds and intellects partake of the same nature, and are founded on the same principle of adjustment, we may feel assured that the same law prevails over their nobler work and functions. And the glorious law is no less than this—that the work of instinct is true not only for the short way it goes, but for that infinite distance into which it leads in a true direction." In connexion with this branch of the subject it may be fairly asserted that, the peculiar scent given out by game, the manner in which game animals (birds in particular) crouch and then suddenly start into motion within range of the gun, and the whole nature, powers of smell, and general economy of hunting dogs, argue an arrangement far beyond the powers of Man. The whole seems a wise adaptation to some specific purpose. Men may have trained dogs to the chase, but could never give to the objects of the chase the peculiarities which distinguish them from other animals, and cause them to be hunted as game, with all the advantages I contend for.

That many men hunt or shoot who do not overstrain their intellect is a mere matter of course, because the instinct of the chase is universal, and is confined to no one class, or intended as a counterpoise to any one tension only in another direction. No "glorious law" can be parcelled out. It would be no more an answer to my

argument to say that men already in robust health of body and mind do hunt or shoot, or that field-sports may be carried to an excess, than to say that we should not eat now, because some other persons have already eaten, nor eat enough, because some people eat too much. Besides, the very state of high health which might be the sentimentalist's argument as rendering the chase unnecessary, may demand an outlet for its energies.

There is an argument I would offer with diffidence, yet I have often thought that, where there is much building up, there must be a yearning for breaking down. Construction and destruction seem the complement of each other. We have a craving to be doing something or other that demands the very opposite of combination of thought. Hence comes dissipation, (literally, scattering) and the denouncers of the morality of field sports lay themselves open to the grave accusation of promoting *immoral* dissipation by vilifying the *moral*, for men will seek some change from their daily routine. Marcus Antoninus told us long ago that Nature is always breaking down and building up. I know not a more refreshing occupation, short of the chase, than trimming one's garden-hedge or shrubbery with a good sharp whittle. Mr. Gladstone finds pleasure in hewing down trees. When the greatest orator of the age, the ever to be respected Member for Birmingham, broke down in health some twenty years ago, his physicians sent him to Scotland to practise one of those field-sports he had so pertinaciously and fervently condemned, and I could not refrain from writing at the time, in a certain

magazine article, that he might have fancied, when he drew his first trout from the waters of Loch Lomond, that it uttered, "*Et tu, Br——!*" with its dying breath. Yet no one would grudge this eminent statesman the health, improved if not quite restored, which his continuance since then of the higher branches of angling has afforded him. Long may he enjoy them!

I know not if it come exactly within the scope of this argument, but it may be incidentally remarked that where there is undue prominence given to the intellectual faculties, or where these faculties have risen to an undue prominence, the family most commonly becomes extinct, or else the intellectual power disappears and is followed by its opposite. The family of the Bernouillis, the famed mathematicians, is nearly the only exception. The existence of their great and hereditary abilities, in which quite a number of them shared, extended over several generations, and beyond 150 years in period of time. But every one knows that an exception only proves a rule. It is a fair assumption, that the mingling of the labours of field-sports with maintained exertion of the mental faculties would tend to transmission of genius.

In judging of the correctness of the foregoing reasoning, and of the morality of field-sports, it would be well to consider how these have been followed by the wisest, the best, the purest of mankind. Witness George Washington, who kept a private pack of hounds, and hunted the fox regularly two or three days a week. The Duke of Wellington maintained the spirits, vigour, and courage of his officers, on his constrained military inac-

tion during several winters in the Peninsula, by the same means. Buxton, the philanthropist, was not only a sportsman, but attributed any success in life, and proper direction of his aims and faculties, to the early moral training he had under a perfectly illiterate but high-souled gamekeeper, whose memory he held in deepest reverence till his dying day! The nearest practical approach I have ever known to the scene in Burns's magnificent "Cotter's Saturday Night" was in the evening family worship of a gamekeeper, under whose roof I found hospitable shelter while on a shooting excursion in Dumbartonshire. It is with all respect and reverence that I may also allude to the case of his late Royal Highness Prince Albert, one of the purest men that ever breathed, whose influence—not the less potent that it was not ostentatiously displayed—operated (and is operating to this day—"he, being dead, yet speaketh") beneficially on the social fabric of this country, and through it upon that of the whole civilized world. Who can read, I may add, the short yet graphic records by the Queen, in her Majesty's "LEAVES FROM THE JOURNAL OF OUR LIFE IN THE HIGHLANDS," of her young husband's exploits in the chase, without a glow of sympathy, and sorrow for her irreparable loss? Who in all history has ever had a name more identified with humanity and all the gentler feminine virtues than Queen Victoria? Yet we see her, free from mawkish sentimentalism, deeply interested in all the Prince's adventures, successes, and disappointments by flood and field. Witness the vigour with which "a magnificent stag" which Prince Albert

had just killed was sketched by her loving hand! We see also all this healthiness of tone and love of genuine field-sports perpetuated in her royal sons. We need not doubt the destinies of a people with such examples set before them, nor fear the degeneracy of the Lower Empire.

In regard to the effect of the pursuit of field-sports on the commercial classes, I shall not readily forget a recent conversation with a gentleman from one of the Western United States of America. I have particular satisfaction in any investigations into the moral and other good effects of shooting, but I have never heard the matter put so plainly. "My father, sir," said my friend, "was the first man that ever took a double-barrel shot-gun west of the Alleghanies, and when I was a boy I always shot squirrels with a rifle. My father was also the first man known to kill birds flying—out there west. He was a great sportsman, and made us, his sons, go out to shoot regularly to make us strong and hardy. Our neighbours said, 'This Mr. Mc O—— is bringing up his boys to ruin, certain and sure; he sends them to shoot squirrels when they should be at the counter and desk.' Well, sir, time went on, and my brother and I went on, not to ruin, but to success in life as well as in shooting, and I used to kill my sixteen squirrels in seventeen shots of a morning. I have a large business, and my brother, who is younger than I, has already retired on a fortune. Of the young men who were pointed out as patterns to us, not one is now living. One died of this, another of that, but mostly all through illnesses brought on by making money their

only object; and I tell you, sir, that on their death-bed more than one of them said, 'These Mc O——s were right, and we were wrong, after all!'"

This simple narrative probably contains the germ of a great philosophical truth. It seems an established fact that, besides the general struggle for existence in all animated nature, there is a special one for existence in individuals imported into a new climate. Let us suppose two families engaged in commerce migrating "out West." The children of one of these are encouraged to familiarize themselves with the surrounding climatic influences; to face and overcome these influences under invigorating action; the children of the other are not, but are brought up, let us say, accordingly with their New York or European antecedents. These sit at a desk, those shoot squirrels in the forest. I think it may be safely predicted which will be the survivors.

This American is a type of the sound sense of his countrymen. There is not a more common fallacy than that game-laws, denounced as the remains of a barbarous feudalism, are not to be tolerated in new countries or under Republican Governments. To many of my readers it may be something new to learn that, in the United States of America, the game-laws are much more stringent than in this country, and embrace a larger number of animals. The penalties are much higher, and every encouragement is given to prosecution by any person by such complainant sharing in the pecuniary fines. Were this a treatise on game-laws I should startle my readers by going more fully into those existing in the United

States. Besides the usual punishment to offenders directly infringing the law, all railway officials, carriers, and such like are heavily fined for illegally transporting game or fish, and where either of these is reasonably supposed to be concealed, the warrant of a justice of the peace authorizes "search to be made at any hour, in any house, market, store, shop, boat, car, or other place or building, or any person for that end may cause any apartment, chest, box, locker, barrel, crate, or other place of concealment to be broken open and the contents examined." It is also provided that "the formalities required in penal actions" need not be complied with. I quote from the Laws of New Jersey, merely because they are the first I chance to light on, but they are very similar throughout the States. If any particular variety of game becomes scarce a State will pass a law to protect it absolutely for several years. What is this to do but what is commonly called here, "getting up a head of game"? Several such enactments are running now. We hear of individual game preservers here being bitterly assailed, yet in the United States there exist over one hundred powerful Associations for the due prosecution of game-law delinquents, and these Associations are rapidly increasing and appear to be highly popular. Here we have one struggling Anti-Game Law League; in the States there are over one hundred flourishing Pro-Game Law Leagues. The cry of a party here is:—Utterly exterminate all game as vermin; leave nothing to shoot at. The increasing general cry across the Atlantic is:—Preserve our game and our fish for our genuine field-sports. There is no opposition

party in the field. The Associations are banded together, not to oppose any other party, but to stimulate legislative vigilance. This is a curious antithesis. It may be likened to the different training of youth in Sparta and Athens. The latter encouraged the chase, the former denounced everything not directly or palpably useful, even to any superfluity of words. We all know which Republic lasted longest, or rose to the highest point in civilization. We need not fear the final result in our own country, but the Americans are also wise in their generation, and seem resolved to maintain the vigour of their race by the means which Nature has appointed.

If we turn for a moment to a very different country, old in its institutions and the most densely populated in Europe—Belgium, we shall find equal stringency. In a communication which the Belgian Minister of the Interior did me the honour of sending me for the purposes of this inquiry, I learn that in addition to the punishment as a matter of course of a convicted delinquent, the farmer, or farm foreman, is held responsible for acts of poaching committed by minors and some others; a system that would not be tolerated in Britain. This is stringency indeed, and yet, while high cultivation is alleged to be incompatible with the existence of game-laws, no country in Europe, or probably elsewhere, is more highly cultivated than Belgium.

Since I have made this digression I may state that, while undue preservation of game is open to severe censure—the effects are too frequently greatly overrated. I have had much experience, and have been surprised to find how

bitter complaints by farmers have ended in the finding of no appreciable injury to the crops. But I would desire to write much more freely on the absurd outcry made against "deer forests." Wherever deer do injury let the blame rightly fall and a remedy be found, as by sufficiently fencing the nearest arable lands; but what I specially refer to is the misleading of the public opinion on what a "deer forest" consists of, until the masses believe that it is a tract of valuable wooded land, able to support a large number of sheep or oxen, being wickedly devoted to the feeding of a few red-deer kept for sport. Deer forests (in this country they are only, so far as I know, to be found in Scotland) are tracts of the roughest, wildest, most inaccessible, and most valueless land in the Highlands. As for being "forests," there may not be a tree upon them. True, they might support a few cattle, but would it pay to do so? Are sheep to be kept there at a loss for the sentiment of the thing? I write advisedly. Some three years ago an unusual clamour arose because a certain sheep-farm in the north-west of Scotland was bought by a gentleman and turned into a forest. I cannot recollect anything more virulent than the obloquy thrown upon him. Knowing the purchaser, and believing that from his whole tenor of life, general character, and political bias he would be a very unlikely person to either do a wrong thing or run counter to the liberal tendencies of the age, I asked him to tell me the real facts, and learned that the farm in question had ruined tenant after tenant; that it was quite unsuited for profitable pasture; and that, at the time of the purchase, several of

the neighbouring farmers, who of all men, considering the competition in Scotland for farms, had a right to complain, had thanked my friend for "afforesting" the estate and so removing temptation to inevitable ruin from before their eyes!

The direct purpose, then, of shooting is to stimulate what may be called concentrated labour. That is, labour in proportion to previous enforced physical inaction; that physical inaction having been a necessity under prolonged intellectual exertion, or otherwise under the conditions of high and advancing civilization. To write on the immediate effect on the human system is uncalled for. No one denies the benefits; they are plain and self-evident as affecting the body. The appetite and digestion gradually improve; and although I have avoided any of those references to the proper cooking of game usually made in books on shooting, yet through all time a hunter's or sportsman's appetite has been taken as a matter of course, and as his due reward. Twenty-three hundred years ago Euripides wrote,—

Τερπνὸν ἐκ κυναγίας
Τράπεζα πλήρης,

which I may translate freely as—

'Tis pleasant when the chase is o'er
At tables full to feast galore.

The effect upon the mind from my stand-point, as bearing upon Man in a highly-civilized state, is of prime importance. Harking back to Benvenuto Cellini, we find these words—"My spirits *suddenly* revived. I had

no longer my usual gloom." Why, he probably could not himself explain; but he recorded what modern science can better account for, and what I have myself experienced, as probably have many of my readers. I remember that my late beloved friend and pastor, the Rev. Dr. Norman Macleod (who used to tell me that he endorsed every one of my published opinions on the morality of field-sports), took much interest in the fact that, under the stimulus of shooting, a melancholic cloud will pass away from the mind so *instantaneously* as only to be likened to rapidly drawing up a curtain and letting bright light into a dark room. This probably arises from the balancing at that precise moment of the excretory action of the liver and lungs, and so a most mysterious phenomenon may be accounted for. I only refer to this phenomenon as a proof of what great general beneficial action must be going on in all cases, and by no means require to narrow up my argument into any speciality. I choose one remarkable illustration without disparagement to other results probably as remarkable although less striking. It may not be out of place to mention, however, merely as a fact on which I would desire my readers to reflect, that in all probability almost the whole Protean forms of what are termed "nervous diseases" arise from the inability of the lungs to consume, literally burn up, the fuel provided by the liver. Hence bile accumulates and invades the brain itself. This produces "melancholy," literally "black-bile," and it is remarkable that the ancients should thus so truthfully realize the disease in its verbal designation, although the

malady seems mental, while the designation is physical. Until recently the liver was supposed to throw off only a small quantity of bile daily, to be utilized in the alimentary canal. But modern research proves that the daily secretion of bile amounts to no less than three-and-a-half pounds! The liver excretes this bile and also fat and hydrated starch, all which finally become the fuel which provides us with heat. I do not pretend to define this exactly or scientifically, but take my facts from the most distinguished authorities. If the furnace, the lungs, will not, through want of exercise or other causes, consume this fuel, the effects are disastrous. So little was the function of the liver understood, or this quantity of bile duly estimated, that it was thought on any occasion of disorder quite enough to carry off a little extra quantity of it by the use of mercury or other drugs. How trifling the benefit to be finally derived thereby may be judged by the fact that of the fifty-six ounces of bile daily secreted, only about two are used in the alimentary canal! In the accumulation of bile having in many cases its sole and genuine remedy in prolonged severe labour, under a stimulus demanded by the very nature of the case, lassitude being its invariable concomitant, we have the complete proof of the correctness of the Duke of Argyll's reasoning—that instinct guides to results far beyond its immediate promptings. A healthy boy ardently desires to fire a gun at a rabbit. This is the same instinct which later in life may be the means of reinvigorating his jaded energies. I have specially referred to "nervous diseases," because these may most

assuredly be termed the great general malady of the age. Every physician knows this; and the art of healing is daily more and more resolving itself into less of drugging and more of directing the patient in his diet and exercise. "Have you a billiard-table?" asked a London physician some two years ago, of one consulting him. "No." "Then get one, and play for two hours every night before going to bed. That will bring you sleep, and do you more good than all the drugs in the pharmacopœia." This, with some good advice on diet, was the sole prescription; and never was a guinea more profitably expended!

In concluding these remarks I would desire to say that I have no wish to strain my argument, or to elevate its subject into undue importance. Every good thing is good in its own place. But boastful attempts are being unceasingly made to prove to be wicked what I believe to be a wise arrangement of Providence to preserve the vigour of the human race, and I am quite content to leave my arguments to the judgment, not of sportsmen only, but of all interested in the welfare of mankind.

THE END.

SUMMARY, 1881.

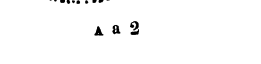
DURING the few years which have elapsed since the publication of the previous edition of this work, progress has not ceased, and the most striking subject for present remark is undoubtedly that of hammerless guns. The reader may observe that I wrote of these weapons with reticence and impartiality, well knowing that, as I said, "time, which tries all things, must try this also." In discussing this question, I kept in mind that, as this book is not a mere gunmaker's advertisement, it was my duty to place before the reader the facts within my knowledge up to that period. I knew not of any hammerless gun I could honestly recommend, and, on the contrary, knew that there had been numerous lamentable failures. The only occasion on which, with all my experience, I ever saw a gun fly to pieces was when one of these did so on being fired at a target. Not knowing personally the two very respectable persons who were "targetting" it, a feeling of delicacy kept me from asking any questions, but this form of gun was at that time being pushed by strongly worded advertisements to a degree I do not remember being equalled. It is now, I may state, utterly unheard of. That hammerless guns are now in the ascendant, may be accepted without cavil. Incessant ingenuity has been at work to improve their mechanism, which indeed shows that this improvement was demanded by circumstances.

In my own case I have not been idle, and I had this advantage, from not rushing blindly into the movement, and merely to obtain business, that the rocks on which others had made shipwreck could be avoided. After some three years of planning, designing, and actual working out a hammerless gun on which I could stake my reputation, I may be permitted to state, without self-praise, that this weapon has only to be seen to show, at a glance almost, its remarkable excellence. All the essentials of a good gun are there: solidity, security, hard shooting powers combined with lightness and the very perfection of balance. By an ingenious contrivance the eye, on taking aim, is drawn into the centre of the breech. This, however, is not new; I made many guns with it some thirty years ago, finding, in practice, that it greatly assisted the aim. This contrivance removes the not uncommon objection that the absence of hammers militates against taking the line of sight from the dead centre of the breech. The internal hammers (it may be observed that the term "hammerless" is a misnomer, there must be hammers, or plungers acted on by a spiral spring—the worst possible form) have a good swing, being quite unique in this respect, and are so constructed that were a percussion cap to break, a most rare thing in good cartridges, the smoke cannot make its way back. The stock, where the wood meets the breech, instead of being hollowed out as empty as a cocoa-nut shell, is as solid as in any form of gun; and solidity at that place, the *point d'appui* as it were, is a prime element in the construction of a good firearm. This, perhaps, is the cause why these guns are found to possess remarkable freedom from recoil. For curiosity I tested a 12-bore 30-inch gun, weighing 6 lb. 2 oz. only, with the unusually heavy charge (pigeon-gun charge, in fact) of $3\frac{1}{4}$ drams of powder and $1\frac{1}{4}$ oz.

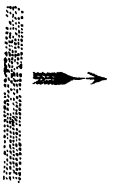
shot, and to my agreeable surprise found no recoil! This I consider a very remarkable thing. I do not care to dilate further on this topic, for obvious reasons, and leave unsaid much that might appear dictated by pecuniary or business considerations. The gun, in point of fact, needs no laudation to bring it into notice, and has already given the highest satisfaction.

Choke-bore guns cannot be said to have held their own during these recent years. By "choke" I mean that excessive degree of it which gained an over-due reputation by mere closeness of pattern on a target. A target is fixed: it is not like a bird flying swiftly, and the pellets which reach and strike it make their mark all the same, if merely judged by counting their number, although they may have travelled in their flight in such a manner as greatly to mar their effectiveness on game. I very soon discovered this, and introduced that form of boring which, for want of any other term I could think of, is called "Express." By this, greatly increased shooting powers are gained, and it has been publicly testified by eminent sportsmen that game are not cut to pieces thereby at short ranges, while the killing distance is much prolonged. This may be seen almost any day in the grounds of the leading pigeon clubs, during the matches.

This is not theoretical, but has been demonstrated by ingenious and careful experimentation, the results being now first published. The mode employed I do not care to describe, and indeed it is purely technical and unfitted for general practice. It proves that the shot from a choke-bore fly in the form, let me say, of an egg, going lengthwise, so—



and although it is impossible to define the actual length of this supposed egg, yet it is so great that there is a positive difference of time between the front and rear pellets reaching the target. In fact, it is shown that the shot must fly in a long and narrow stream. A properly constructed gun, on the contrary, causes its shot to travel in a nearly perfect perpendicular plane, thus—



reaching the target simultaneously or nearly so. This shows how that a gun may be effective at long ranges, yet not cut up its game at short. A bird or other animal going straight out may be either entirely missed, or literally dusted with pellets from a choke-bore, and so rendered nearly useless for the table. A bird crossing rapidly, on the other hand, is much more likely to be missed, the area of the shot being so much smaller.

This brings up the subject of velocity. My "nineteenth of a second" (page 108) has been objected to; and it has been somewhat dogmatically declared that the time occupied by the flight of small shot over forty yards is some seventh or eighth of a second. I adhere to the "nineteenth" most rigidly. Having utterly ceased to enter on useless and interminable discussions in the public press, I allowed the objection to pass unchallenged. It was unwarrantedly stated that the question had been settled for ever by the use of a chronograph. One would have thought, by the

style and construction of the announcement in question, that the chronograph stood at the writer's door, and was in daily use. Judge, then, my surprise at learning that he had made a flying visit to a large gunpowder manufactory, and had fired a few shots only; and also on being told by a friendly brother gunsmith that he had tested the velocity of rifle bullets by the same instrument, that it was constructed solely for testing the flight of rifle bullets, and, further, that he could not see how by any possibility it could test the flight of small shot! This is an instance of the frequent utter valuelessness of announcements in the public prints, however clothed with apparent authoritativeness. I submitted the question at the time to the highest authority on the Continent, a sportsman who has spent an enormous sum, calculated in tens of thousands of pounds sterling, in guns and gunnery, and had the pleasure of being informed that my "nineteenth" is perfectly correct, and his opinion was that a bullet takes about the seventh of a second to travel the same distance. On this I venture no opinion of my own, but an acute reader will perceive a remarkable accordance in the bullet's flight with that supposed of small shot when tested by the chronograph, and draw his own conclusions. The distinguished foreigner referred to, I should add, a year or two ago published a book on sporting guns, and did me the honour to adopt my system of testing velocity by sound, and to give a copy of my diagram as it stands at page 109. As Scottish lawyers say, he thus "homologated" my theory. But it needs little scientific testing to disprove the seventh of a second theory. Were it correct, a bird flying across at a fair pace, say at 30 miles an hour, would demand the aim to be taken in advance at some 3 feet at 30, 5 feet at 40, and no less than 11 feet at 50 yards! I may not be mathematically

correct, but the exact figures may easily be ascertained by computation. No experienced sportsman need be told that there is no such holding on in front in common practice. The "seventh," therefore, proves too much, always a damaging line of argument. Thirty miles an hour for a bird's flight is a moderate estimate; some birds (possibly driven grouse) go at 100 miles an hour.

I have been asked to extend my remarks on "Express" rifles. Perhaps from familiarity with the subject I am at a loss to see what more I can usefully write upon it. The matter lies in a nut-shell, and is this: that up to the point-blank of the rifle's range you can fire dead on at the object of aim, without allowing for distance, just as you would fire at a snipe or partridge at twenty-five yards.

In ammunition things remain much the same. I have seen and tried some remarkable powder lately introduced by Messrs. Curtis's and Harvey. The superior results are produced by a peculiar mixture of differently sized grains. Probably their action is to burn up each other more thoroughly. It is somewhat more expensive, but the enhancement in cost is not worthy of a moment's consideration. I hear a curious rumour that foreign gunpowder is being largely introduced into this country, from its cheapness I presume. Can this have anything to do with cheap cartridges? It is notorious that Continental powder is very inferior to English. In new explosives, all seem to have disappeared save Schultze's. I quite expected this.

The Newcastle Chilled Shot Company, Limited, send me the following information on their shot. I print it *verbatim*:—

"The claim we have for the superiority of our Chilled Shot, is its hardness *throughout*, so that it will remain

intact when striking a harder substance, yet it is *not hard enough* in itself, agreeing with your views about hardness, to injure barrels when passing through; whilst the hardness of the imitation shot is only *outside*, produced by a mixture of other metals. A great many customers, who have tried to do with the latter, have fallen back to the use of our make. Some two years ago we received an advertisement from Canada that a 'double-chilled shot' was being made over there, accompanied with a hint that they need no more send for our make and pay the 25 per cent. duty for it; but last year we had again several orders for this colony, and we have executed this year already five different orders varying from two to five tons for the same country. We may add that the great regularity of size and uniformity in shape distinguishes our make as well."

The question of penetration not being a true measure of velocity, if the substance fired at be confessedly too great for the shot to pass through the whole mass, as is unfortunately generally used, has drawn much attention. It is pleasing to know that in the United States my reasoning has been approved, and its correctness established by practical experiments. In this country, however, there is much mischief still so created, and guns of the highest excellence are even yet apt to be condemned for want of the great killing quality—velocity—by fallacious tests. That which is supposed to prove want of due velocity actually proves its possession. The reader may observe that as a rule I decline giving the names of my correspondents. This arises solely from my having no right to drag them into controversy, for of a certainty, such is the irritability of those who delight in ventilating their opinions, this would be the result. Now, however, that he has gone over to the majority, I may state that the *savant* whom I refer to at page 104, was the late GEORGE HENRY LEWES.

On this subject my general experience, in addition to some knowledge of general physical laws, was my guide, as brought to bear upon miscellaneous tests. A friend, however, who is quite a *connoisseur* in these matters, pressed me to bring it to an exhaustive trial. He had general confidence in my practical knowledge, yet was sceptical on this point, if not directly opposed to me. Here, then, I was offered the assistance of one not to be easily convinced, and I willingly accepted what I may fairly call a challenge.

I constructed a rack, carrying a number of Bristol-boards placed at a distance from each other, and provided myself with the usual paper pads, as made specially by a respectable firm for several years past. Through these pads, with the additional sheets now in use, no gun can drive No. 6 shot at forty yards, the invariable shot and distance at such experiments. A large number of cartridges were loaded with different charges of powder. Almost as a matter of course we found that as more and more powder was used, more and more of the Bristol-boards were perforated. Every shot was carefully noted, until perfect assurance was attained that the greater the velocity the greater the penetration. This was because the test was true; reaction there could be none, as the boards did not touch each other. Having exhausted this test, the next step was to fire at the pads. With a life-time's experience and convictions, I confess to some anxiety, asking myself, Can it be that I may have been in error all along, and now shall have this proved? My friend was sceptical. Another gentleman, taking equal interest, was at least very dubious. My "targetter" was dead against me, not from any actual tests of his own, but on the broad principle that penetration at one series of sheets would be the same as at another. In point of fact, he

represented the popular belief on this question. Well, the result was that the heavy charges of powder, giving of necessity the higher velocity, gave penetration in an inverse ratio! Very small and inadequate charges of course, in both instances, gave insufficient penetration —that goes without telling—but increased charges, as developing that high velocity which sportsmen wish for, and should get, gave less penetration than that obtained from lower velocity, such as given by mediocre guns. The question was put out of all doubt in my favour. One of my friends (both being men of acute minds and accustomed to sift evidence) now proposed a very ingenious test. "Let us suppose," he said, "that at a greater distance or distances, there must be a point at which the velocity is equalized, or nearly so, from the heavier and lighter charges. Well, then, will you risk your theory at sixty yards?" I could not well see how, without an immensity of trouble, we could ascertain the equalizing distance, but I proposed fifty yards. My experience taught me to consider ten yards a fair and sufficient increase. At fifty yards, then, the shooting was resumed, with only efficient cartridges, but with different charges. The result was decisive; by some remarkable law, which it might be difficult to explain, but I give the exact result, the penetration was exactly equalized. Shot after shot, with the greater and lesser charges of powder, gave equal penetration at this abnormal fifty yards' distance. The high forty yards' velocity was lowered, and now sent its shot deeper; the lower forty yards' velocity was of course lower still at fifty yards, but the penetration was much less affected, and an equality was arrived at; the penetration from the former having increased in a greater ratio than the latter had fallen off through increased distance. I need not say how I was congratulated, and shall never

forget the face of my *employé*, on what was, to him, an impossible result; neither need I hesitate to record that other practical men were surprised to learn all this, and admitted that they had expected the reverse, so deeply has this fallacy been rooted.

At page 45 I refer to taking aim with both eyes open being said to be forbidden in the Army. One soldier—*per fas aut nefas*—has had the courage of his opinion; and the *Graphic* of July 17th, 1880, gives the portrait of Sergeant Armstrong, "the best shot in the British Army," as having been awarded, for his unrivalled skill, a silver medal, and as having received complimentary mention from H.R.H. the Duke of Cambridge. This good and tried soldier had previously been decorated by her Majesty's own hands; but what makes him a peculiarly acceptable person for me to read of is, that "he shoots with both eyes open"! Let others follow his example.

The interest taken by many sportsmen in this little book is gratifying, and I have had many proofs that every line has been carefully considered. The velocity of small shot is the only point with which fault has been found—fault, I repeat, unfounded. An anonymous correspondent, writing from Ireland, was so good as to inform me that he fancied me in error in giving Marathon as the field of battle on which leaden projectiles were used, and suggesting that I should have written "Cunaxa," referring me also to Xenophon's "Anabasis." On looking through that work I found references to the use of these leaden missiles, possibly by the Persians, as well as by the Greeks during their famous retreat. But this in no way disproves that they were used at Marathon on that day when—

> "The mountains looked on Marathon,
> And Marathon looked on the sea."

Indeed, they are found on the scene of the battle until

this day. The Anabasis shows that they were in common use by the ancients, and they are also mentioned by Ovid and Silius Italicus. I am obliged to another gentleman for the information that he considers the pointer with the deeply-cleft nose to belong to the south of France, and not to Spain. Being very common in Spain, they are, he says, supposed to belong to that country. It matters little. A highly esteemed friend, proprietor of an extensive deer forest, strongly recommends that forests should not be entirely cleared of sheep. He finds that if this be done, the grass becomes coarser and less nutritious. The presence of a small number of sheep keeps it in better order, and he cannot say that it interferes with sport. It is to be regretted that a senseless cry is still occasionally raised against deer forests (see letters in *The Times* and elsewhere), under the delusion that they can be profitably used for pasturing cattle. Doubtless cattle can be pastured, or rather starved, upon them, but not with profit to their owner; yet somehow it is fancied that this should be done for the sentiment of the thing, even if to the ruin of the farmer. In the face of the immense modern importation of live and dead meat, all the cattle that could be raised on all the forests in Scotland would be as a drop in the bucket, and any cheapening of food to the public therefrom is an utter delusion.

From deer forests to grouse moors is a natural step. The severity of the winter of 1880-1, with six months absolutely of severe weather, caused many to fear that grouse would suffer to the quick. If bad weather could create disease, surely it should have done it now. Yet strange (or rather not strange to say, there being little or no over-stocking) there has not now—September—been a whisper of disease. The following extract is from a

letter received in May of this year (1881). It was in reply to one from me, in which I incidentally wrote, "The grouse prospects seem good, another proof that bad weather is not the cause of 'disease.' Only overstocking can produce it, as I have written publicly for nearly thirty years, at first being ridiculed, but now my opinion is widely accepted, and gaining ground every year." The opinion of this correspondent, living nearly all the year round on his Highland estate, is valuable not only as corroborating my theory, but for the additional corroboration of the propriety of killing off the solitary cocks, although this does not bear directly on grouse disease, but on the general management of a moor. The district in which his estate lies has been notoriously periodically scourged by disease. There must be a cause, therefore, for that estate's immunity.

"You are perfectly right as regards grouse disease. We have had it all round us at least twice during the last ten years, but our own moor has always escaped, chiefly, I think, because we shoot it regularly, but not severely, leaving as many hens as possible, but not sparing solitary cocks in October. Of these far too many are always left everywhere."

It may be asked, where do grouse go during the heavy snow-storms, and when snow is lying deep on the ground? They certainly disappear. A nobleman, proprietor of extensive estates in Perthshire, recently told me that, being anxious as to the condition of his grouse during the heavy snows of last winter, in the month of February he sent several keepers over a wide tract of moor, and they returned with the disheartening report that they could see no grouse whatever. When the weather improved, and pairing-time came, there were the birds in abundance! My own opinion is that they seek long heather, upon the

top of which the snow rests, leaving open spaces below. In these spaces the grouse lurk securely, feeding on what seed they can find on the bare surface of the ground. Probably they require less than the usual supply of food, seeing that these conditions may induce a kind of hybernization. This year will certainly be a crucial test as to the correctness of the over-stocking theory. Under the greater enlightenment on the true cause of disease, this malady will in all probability be much mitigated in the future; but, as I have said on another subject, "time must try." I may give a curious instance of how controversial heat will influence public writers. One of these, who has for many years contributed to a popular journal, ridicules the idea of grouse becoming diseased through "over-stocking," using, for that term, "jostling each other on a breezy hill-side." Such a mode of argument only raises a smile.

A very effective mode of circumventing partridges when wild has been described to me. It is practised among turnips and other green crops. The sportsman sends an attendant some moderate distance in advance, but to one side. The attendant keeps describing a circle, of no great extent, and resting occasionally at fixed distances, as arranged beforehand. The sportsman then describes a larger circle, keeping continually on the move, and guided in his operations by the position of the attendant, so that the ground is duly gone over. After the sportsman has described his circle, the attendant goes on as before, finishing again in advance and at the side. This is carried on by both until all the field has been traversed. The alleged result is that, instead of running, the birds, probably bewildered by the circling movements, and not knowing in what direction to escape, sit well and afford shots. My informant laboured one day for six

hours with no results, when an old sporting farmer showed him the above system, and my friend and he then made a heavy bag over the same ground! He never found it to fail on other occasions. It is certainly worthy of a trial.

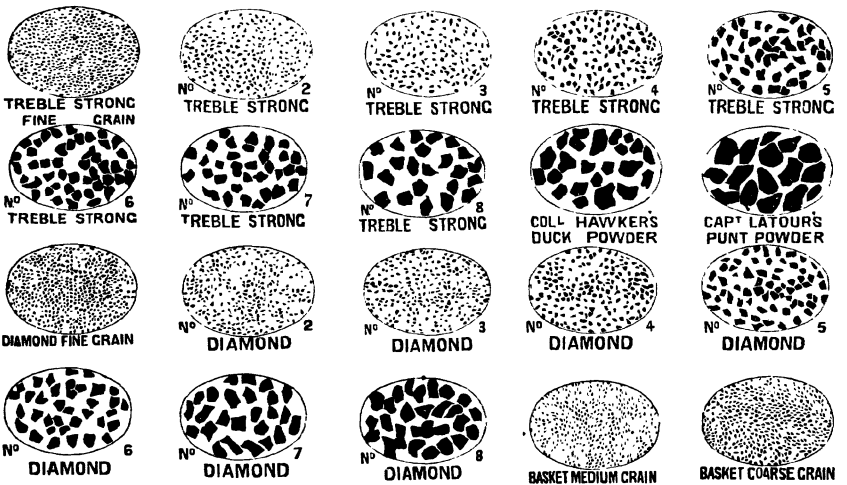
Sportsmen have been somewhat scared by the Hares and Rabbits Bill. I have a presentiment that little or no harm will be done. There has been a foolish interference (now being remedied) with the sale, during part of the year, of wild pigeons, just at the season when game is out. These pigeons are good eating, and when dressed with a stuffing made of pounded Yarmouth bloater, are positively delicious. *Probatum est.*

The attacks on the morality of field sports have during these recent years quite disappeared. Their denouncers seemed to fancy they had given them a fatal blow. How they deceived themselves is self-apparent. One has only to read the daily and weekly Press, and to make himself acquainted with that peculiar branch of literature, to learn that the taste for legitimate field sports is increasing every year, not only in this country, but in France, Italy, Spain, Belgium, Germany, and last, yet not least, in the United States. In all these countries there are now journals devoted entirely to this subject. Some of these are beautifully illustrated with sporting scenes. This little work has been honoured by a translation into French, of which a large edition has been nearly exhausted, and another is being prepared. In Italy it has met with great approbation, if not actually translated in full. In Madrid a Spanish translation has appeared, and another and entirely independent one is on the way. The subject, then, must be interesting to very many people. The number of shooting clubs in the United States is hardly credible. In that country, and also in Canada, sportsmen

combine in purchasing tracts of land, if with streams and lakes preferred. These they fence in and call "parks," in which all manner of game is preserved. The United States Game Laws seem to be becoming more stringent than ever, although from the great number of States this may be questioned as not quite universally correct.

On the branch, "Shooting, its Purpose," some critics, while writing in the most kindly spirit, seemed to deprecate its controversial tone. This arose by my own fault. I should have more explicitly stated that the chapter was written, by special request, in answer to the most unwarrantable and self-sufficient attacks upon field sports. Where, possibly, critics thought I was travelling out of my sphere, or producing irrelevant arguments, I was really answering such irrelevancies. I did not seek controversy, than which nothing is to me more distasteful. I have nothing to add on this subject beyond stating that, in a great amount of miscellaneous reading, I have found much during these few years to strengthen my opinions, and have been urged by men whose opinion I value, to write an elaborate work on this subject as affecting the character and history of nations. Whether or not I may live to carry out this lies hidden in the future. Business avocations will, I fear, prevent my entering on the great research required to render such a work worthy of public approval, and I care not to treat the subject in a careless manner. Such a work should be done well, or not at all. I refer to this, not from personal reasons, but to show how popular the subject is. I shall give one illustration only as indicating the scope of such a work. The Bedouin Arabs—the dwellers in tents, not the citizen Arabs—are famed for their robust health. They have come down from the most ancient historical period without deterioration of race, under conditions as affecting

consanguinity which, according to generally received physiological laws, should have produced the most disastrous consequences. This immunity from deterioration is undoubtedly the result of their active life in the open air. That distinguished traveller, Captain Richard F. Burton, says of the Bedouin,—"Even in his sports he affects those that imitate war. Preserving the instinctive qualities which lie dormant in civilization, he is an admirable sportsman. The children, men in miniature, begin with a rude system of gymnastics when they can walk. 'My young ones play upon the backs of camels,' was the reply made to me by a Jahayni Bedouin when offered some Egyptian playthings. The men pass their time principally in hawking, shooting, and riding." No one of sound mind would have it that we should so pass our time principally, but the Bedouins are a living proof of the valuable effect of field sports upon the physical man. Their less roaming congeners wisely admit this, and it is the regular custom to send Arab children, whose parents dwell in cities, to be reared under the tents of the desert. Within my own circle of acquaintance I had a friend who, while neglecting more important affairs, gave himself up to a blameworthy love of sport. Poor, often perhaps suffering privations, dwelling in a crowded city, yet he so hardened his constitution by incessant exercise (following the hounds on foot when much over ninety) that he died not very long ago, a vigorous man to the last, at an age exceeding one hundred years! I recommend no one to follow his example, but the case is interesting as showing how the physical powers can be strengthened and maintained. This person was of a somewhat diminutive figure. At seventy years of age he met with a terrible accident, and for over a year crept about on two crutches, apparently a perfect wreck. Yet, saving a limp,


TREBLE STRONG FINE GRAIN
No 2 TREBLE STRONG
No 3 TREBLE STRONG
No 4 TREBLE STRONG
No 5 TREBLE STRONG
No 6 TREBLE STRONG
No 7 TREBLE STRONG
No 8 TREBLE STRONG
COLL HAWKER'S DUCK POWDER
CAPT LATOUR'S PUNT POWDER
DIAMOND FINE GRAIN
No 2 DIAMOND
No 3 DIAMOND
No 4 DIAMOND
No 5 DIAMOND
No 6 DIAMOND
No 7 DIAMOND
No 8 DIAMOND
BASKET MEDIUM GRAIN
BASKET COARSE GRAIN

he recovered his former activity, to the astonishment of all his friends!

There cannot be a finer illustration of the almost perfection of modern firearms than to give examples of the different sizes of gunpowder used in sporting guns and rifles. These woodcuts represent the various forms and sizes of Messrs. Curtis's and Harvey's powder. It should be distinctly understood that each of these will more or less modify the shooting of any individual gun. No. 6 is the favourite size for Express rifles; Nos. 4 and 6 for breech-loading fowling-pieces. When any gun recoils or scatters, use the larger-sized grains. As a rule, nothing smaller than No. 4 suits breech-loaders. These illustrations may also serve to show, conversely, how delicate must be the boring of gun-barrels, and how numerous the tests, to produce first-class shooting, seeing how easily that shooting is affected for better or worse. Yet there are not wanting those who believe that all guns shoot equally well if held straight. Nothing can be a greater mistake, and, indeed, were it true, high-class gun-making would disappear, and one level mediocrity take its place. The reverse movement goes steadily onwards, and to maintain the highest standard becomes yearly a more difficult and trying art.

It is from this reason that, as I predicted at page 111, fine guns have advanced in price. This may appear strange, but is undoubtedly the case, and "facts are chiels that winna ding"—in plain words, they are inexorable. Many readers may have thought that my prediction was rash, but it has been fully verified, and this in the face of the cuckoo cry, "Why give more?" More is given, because it ensures excellence, and that excellence cannot be attained without it. Consequently, experience in inferior guns brings about the conviction that the highest

class weapon is the cheapest in the end. As an American sportsman lately put it to me very pointedly, "I wish you to make for me one of your finest guns, as I feel assured it will be the best economy. I have had three so-called best guns by another maker; out of them I have two bad, and one indifferent, yet they were of no small price, and the last has, of course, cost me the price of three, for I cannot use the other two." If these remarks be considered uncalled for, I beg my readers to bear in mind that unceasing efforts are being made to destroy a branch of high mechanical art for which this country is pre-eminent, and which must be inevitably so destroyed if the opinion prevail that first-class gun-makers do not give full value for their prices. All facts go to prove the contrary, and that the prices are honestly earned.

Let me conclude with one other case, which, having also just occurred, comes in *apropos* to this question of prices. An esteemed patron, well known in society, was some year or so ago so influenced by this "why give more?" cry that he transferred an order he had been arranging with me to a quarter where he was assured he would get the same quality for half the price. The pair of guns were delivered, paid for, but being found to be practically useless, sent back. As the purchaser is refused any return of his money, the amount is not only lost, but after having had no end of annoyance, he is finally constrained to have reliable guns made. When a low-priced gun happens to suit a person's requirements, he rushes into print, declaring that for any higher-priced weapons the buyer merely pays for the maker's name. No one applies such erroneous reasoning to watches, for instance, although one may chance on a cheap good time-keeper. The extraordinary durability of fine guns is also always systematically ignored; and durability means cheapness in the end.

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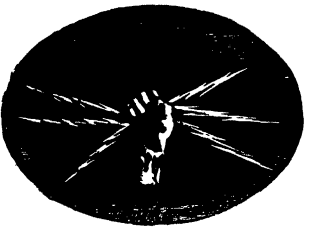
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